15 October 2001
File No. 27285-004

Mr. Brian Mossman
Boeing Realty Corporation
3855 Lakewood Blvd.
Building 1A MC D001-0097
Long Beach, California 90846

Subject: **Site Closure Evaluation - Parcel D Deep Soils, Boeing Realty Corporation (BRC) Former C-6 Facility, Los Angeles, California**

Dear Mr. Mossman:

Haley & Aldrich, Inc. (Haley & Aldrich) has conducted an evaluation for recommended closure of deep soils (vadose zone soils at depths greater than 12 feet below ground surface [bgs]) at the subject Parcel D property (subject parcel). The subject parcel is one of four parcels (Parcels A through D) of the BRC Former C-6 Facility, at 19503 South Normandie Avenue, in Los Angeles, California.

EXECUTIVE SUMMARY

BRC has completed their investigation, remediation, and risk assessment evaluation of impacted soils within the subject parcel. These activities included:

- Investigation of the vertical and lateral extent of soil impacts
- Remediation of arsenic-impacted shallow soil
- Groundwater monitoring for the presence of arsenic
- Preparation and regulatory approval of risk assessment work plans
- Evaluation of the potential for adverse health effects from residual soil impacts
- Evaluation of the potential impacts on groundwater quality from residual soil impacts

Based on the closure evaluation presented herein, it is recommended that the Regional Water Quality Control Board – Los Angeles Region (RWQCB) issue a "no further action" letter for deep soil impacts at the subject parcel (Parcel D) based on the following conclusions:

1. A review of the results of the investigation and shallow soil remediation activities conducted at the subject parcel from 1999 through 2001 indicates that both the vertical and lateral extent of soil impacts have been defined and removed as appropriate.

2. Parcel D risk assessment guidelines were developed in the Parcel D Sampling and Analysis Plan (Integrated 1999a) and results of the initial post-demolition risk assessment are included in the Parcel D Post-Demolition Risk Assessment report (Integrated 2000).

3. In a letter dated June 27, 2000, the Department of Toxic Substances Control (DTSC) indicated that it agreed with the conclusion that residual soil impacts do not pose

unacceptable health risks. The results of the post-demolition risk assessment, approved by DTSC, also indicate that the soil does not pose unacceptable risk to human health from inhalation of volatile organic compounds (VOCs) from VOC vapor migration into onsite buildings.

4. In a letter from the RWQCB dated February 25, 2000, the RWQCB concurred with completion of the arsenic-impacted shallow soil remediation activities, however requested additional depth-specific soil VOC data near boring B7 due to increasing concentrations at 25 feet bgs. Boring D1 was advanced to groundwater (65 feet below ground surface (bgs)) and results indicated decreasing VOC concentrations below 25 feet bgs. The RWQCB indicated that no additional soil or groundwater investigation is required on Parcel D with respect to arsenic in a letter dated March 14, 2001. The results of boring D1 meet the RWQCB-requested data requirements for completing the deep soil risk assessment.

5. Concentrations of phenol have been detected in soil and concentrations of chloroform, and the chlorinated VOCs tetrachloroethylene (PCE), and methylene chloride have been detected in onsite soil and groundwater. No source of phenol and chlorinated VOCs originating from the subject parcel has been identified. Chlorinated VOCs have been detected in groundwater migrating from the Montrose site (to the immediate south of the subject parcel) onto the subject parcel. Thus, it appears that the concentrations of chlorinated VOCs and possibly phenol detected in onsite soil samples may be attributed to vapor migration from impacted groundwater and/or impacted soils beneath the Montrose site.

6. The following additional potential exposure pathways were evaluated after incorporating the January 2001 investigation results:

   - inhalation of VOCs in indoor air from upward VOC vapor migration from deep soil into onsite buildings

   - inhalation of VOCs in indoor air from upward VOC vapor migration from groundwater into onsite buildings

   - inhalation of VOCs in indoor air due to VOC migration from deep soil leachate migration to groundwater and subsequent VOC vapor migration from groundwater into indoor air

   Adding the estimated risks from the above-listed pathways to the potential on-site receptors as presented in the post-demolition risk assessment do not result in risks greater than the Office of Environmental Health Hazard Assessment (OEHHA)-approved acceptable risk levels.

7. The existing residual chemical concentrations in onsite soils do not pose a threat to groundwater quality.

BACKGROUND

SITE LOCATION

The subject parcel is located within the BRC Former C-6 Facility at 19503 South Normandie Avenue, in Los Angeles, California. The approximate location of the subject parcel is depicted in Figure 1. A site plan is presented as Figure 2.

SITE LAND USE HISTORY

The subject parcel was used primarily for parts storage and/or employee parking from the 1940s until the property was vacated in 1996 (CDM 1991; KJC 1996a,b,c; Integrated 1999a). Former onsite Building 59A was used for hazardous waste storage and as an equipment maintenance garage. The storage yard was used to store various parts, including airplane parts, steel beams and pipes, concrete parking pylons, cinder blocks, and tires; it also contained a trash compactor. Subsurface piping or underground storage tanks containing potentially hazardous substances are not currently and have not historically been located on the subject parcel.

OFFSITE SOURCES OF GROUNDWATER IMPACT

The property adjacent to the south of the subject parcel formerly contained the Montrose Chemical Corporation facility (Montrose site), which manufactured dichlorodiphenyl-trichloroethane (DDT), an organochlorine pesticide, from 1947 to 1982 (Integrated 1999a). Dense nonaqueous-phase liquid (DNAPL), comprised primarily of chlorinated VOCs, has been encountered in groundwater beneath the Montrose site (Integrated 2000). In addition, dissolved concentrations of VOCs, including chloroform, extend northward from the Montrose site to beneath the subject parcel and Parcel C of the BRC Former C-6 Facility (KJC 2000b). Figure 10 (included herein as Appendix B) of the KJC 2000b report, presents a composite map of the chloroform concentration in shallow groundwater in proximity to the BRC Former C-6 Facility property. Groundwater monitoring well XMW-09 provides groundwater quality data for this area. The location of the Montrose site in relation to the subject parcel is depicted in Figure 3.

PARCEL D CLOSURE EVALUATION

SITE INVESTIGATION HISTORY

Site investigation activities were conducted at the subject parcel in June and July 1999, October 2000, and January 2001. A list of the various investigation documents reviewed is presented in Appendix A. An evaluation of the completeness of the onsite investigation activities was conducted, including a review of those activities conducted in 1999 and 2000, and of additional activities conducted in 2001.

Overview of Investigation Activities

A sampling and analysis plan (SAP) (Integrated 1999a) was submitted to the RWQCB for review prior to the commencement of the investigation activities in June and July 1999. The RWQCB approved the SAP in a letter dated May 27, 1999 (RWQCB 1999). The objective of the subject parcel investigation was "to characterize soil conditions, support future remediation (if deemed necessary), and support a post-demolition risk assessment of the potential health risks to future users of the redeveloped parcel scenario" (Integrated 1999b).

A review of previous investigation reports (Integrated 1999b, 2000) indicated that soil was investigated to depths of approximately 25 feet bgs. The groundwater table of the uppermost water-bearing zone was reported to be approximately 65 feet bgs. Soil samples were collected from 10 borings at depths of 0.5, 5, 10, 15, and 25 feet bgs and were analyzed for VOCs, semivolatile organic compounds (SVOCs), total petroleum hydrocarbons (TPH), polychlorinated biphenyls (PCBs), pesticides, and metals. The locations of these borings are depicted on Figure 4.

A review of the analytical data for the soil samples collected on the subject parcel in June/July 1999 indicates the reported concentrations appear to be delineated with the exception of chloroform and phenol. Chloroform is considered a VOC, and phenol is considered an SVOC. The deepest soil samples (collected from 25 feet bgs) obtained from Borings B5 through B8 have detected concentrations of chloroform, but only chloroform concentrations of samples obtained from Boring B7 appear to be increasing with depth. The highest concentration of chloroform detected, 0.330 mg/kg, is from the sample obtained from Boring B7 at a depth of 25 feet bgs (Integrated 1999b). The deepest soil samples obtained from Borings B5 and B8 (25 feet bgs) also have detected concentrations of phenol of 1.5 mg/kg and 0.74 mg/kg respectively. The phenol concentrations of the samples obtained from both of these borings appear to be increasing with depth. The highest concentration of phenol detected, 1.50 mg/kg, is from the sample obtained from Boring B5 at a depth of 25 feet bgs.

Borings B5 through B8 were the southernmost borings drilled within the subject parcel. The Montrose site groundwater monitoring well (XMW-09) is the closest monitoring well in

proximity to Borings B5 through B8. The most recent groundwater sample collected from this well was collected on October 12, 2000. This sample contained a chloroform concentration of 1.5 milligrams per liter (mg/L). A copy of the laboratory results for the October 12, 2000 groundwater sample is presented as Appendix C. The locations of monitoring well XMW-09 and of Borings B5 through B8 are also depicted in Figure 4. No phenol groundwater data is presented in either the KJC 2000a or KJC 2000b report for this well or other wells situated in proximity to the subject parcel.

No source of phenol and chlorinated VOCs originating from the subject parcel has been identified. As indicated above, chlorinated VOCs have been detected in groundwater migrating from the Montrose site onto the subject parcel. Thus, it appears that the concentrations of chlorinated VOCs and possibly phenol detected in onsite soil samples may be attributed to vapor migration from impacted groundwater and/or impacted soils that have migrated beneath the Montrose site to the subject parcel.

Additional Investigation of Arsenic in Groundwater - 2000

In a letter from the RWQCB dated February 25, 2000 (RWQCB 2000), the RWQCB concurred with the completion of the arsenic-impacted shallow soil remediation activities documented in the October 1999 Integrated report (Integrated 1999b), and requested monitoring for potential arsenic impacts to groundwater beneath Parcel D. In response to the February 25, 2000 RWQCB letter, a groundwater sample was obtained on October 12, 2000 from a groundwater monitoring well (XMW-09) situated on the subject parcel (BRC 2000a). BRC transmitted the arsenic results from the groundwater sample to the RWQCB in a letter, dated November 28, 2000. The reported arsenic concentration for the groundwater sample collected from XMW-09 was less than the laboratory detection limit of 0.010 milligrams per liter (mg/L). After review of the arsenic data, the RWQCB indicated in a letter dated March 14, 2001, that no additional soil or groundwater investigation is required on Parcel D with respect to arsenic.

Additional Investigation of VOC Impacts - 2001

In a letter prepared by the RWQCB on January 5, 2001, the RWQCB indicated that "no further action is required for the shallow soils at Parcel D and concurred that the site is appropriate for commercial/industrial redevelopment provided that redevelopment does not prevent or interfere with any required supplemental investigation, remediation or monitoring". The RWQCB letter further indicated that they will review the existing data and determine if any additional investigation, remediation, or monitoring is required for the deeper soils (below 12 feet bgs to the underlying groundwater) or groundwater beneath Parcel D. The RWQCB also acknowledged that they "are aware of significant groundwater contamination migrating from the adjacent Montrose facility, a United States Environmental Protection Agency (EPA) Superfund Program site, which has resulted in significant groundwater contamination adjacent and beneath Parcel D.

Pursuant to the request of the RWQCB, one additional soil boring (Boring D1) was advanced adjacent to the former Boring B7 by KJC on January 29, 2001 to delineate chloroform concentrations in deep soil beneath the subject site. Boring D1 was completed using a truck-mounted hollow-stem auger drill rig. Soil samples were collected at depths of approximately 35, 45, and 55 feet bgs using a California-modified split-spoon sampler equipped with two decontaminated six-inch brass sample sleeves. The ends of the sleeves were sealed with teflon and plastic end caps and placed in a cooler with ice for transport to the analytical laboratory following standard chain-of-custody procedures. Each sample was analyzed for VOCs following the EPA Method 8260B. A copy of the laboratory report is presented as Appendix D, and a copy of the boring log is presented as Appendix E.

A review of the laboratory results indicates that chloroform and methylene chloride were detected slightly above the detection limits. Each of the reported chloroform concentrations from Boring D1 is less than the highest chloroform concentration for the June/July 1999 investigation activities. These results and previously detected PCE and phenol results for soil samples collected on the subject parcel are depicted on Figure 4. The highest chloroform concentration, 0.016 mg/kg, was measured in the soil sample collected at a depth of approximately 45 feet bgs. This concentration is less than the previous chloroform concentration measured in the soil sample collected at 25 feet bgs in Boring B7. Thus, the reported concentrations in Boring D1 indicate vertical delineation and a decrease in chloroform concentrations with depth. The highest methylene chloride concentration is 0.0068 mg/kg (slightly higher than the laboratory detection limit of 0.0050 mg/kg) for the soil sample collected at a depth of approximately 35 feet bgs. Since methylene chloride had not been detected in soil samples during the June/July 1999 investigation, it's detection in boring D1 at trace levels is not considered to be of concern.

DTSC and RWQCB Concurrence with Post-Demolition Risk Assessment

A post-demolition risk assessment was conducted to evaluate "the health protectiveness of post-demolition site conditions" (Integrated 2000). The DTSC reviewed the post-demolition risk assessment and indicated in a letter dated June 27, 2000 (DTSC 2000) that it agrees with the conclusion that residual soil impacts do not pose health risks greater than acceptable levels. An evaluation of the results of the previously prepared post-demolition risk assessment, and additional risk assessment and groundwater quality protection assessment after incorporating the data from the January 29, 2001 soil sampling activities is summarized below. The associated risk assessment calculations are presented in Appendix F.

A review of the post-demolition risk assessment (Integrated 2000) indicated that, subsequent to the 1999 investigation and shallow soil remediation activities at the subject parcel, a human health risk assessment was conducted to evaluate potential risk posed by residual impacts to onsite soil. Chemicals of potential concern (COPCs) identified for the post-demolition risk assessment included arsenic, beryllium, chloroform, phenol, and PCE. Potential inhalation

exposure due to migration of VOC vapors into indoor air within buildings was evaluated using VOC concentrations detected throughout the soil column.

Additional Risk Assessment Activities

VOCs in groundwater may also volatilize from groundwater and migrate upward through the soil column and into indoor air. Potential VOC vapor migration from groundwater into indoor air within buildings was not evaluated in the post-demolition risk assessment, nor was potential for further degradation of groundwater quality due to VOC leaching from soil to groundwater. Thus, the following potential exposure pathways not previously addressed in the post-demolition risk assessment were evaluated and summarized herein:

- inhalation of VOCs in indoor air from upward VOC vapor migration from deep soil into onsite buildings incorporating the January 2001 investigation results

- inhalation of VOCs in indoor air from upward VOC vapor migration from groundwater into onsite buildings

- inhalation of VOCs in indoor air due to VOC migration from deep soil leachate migration to groundwater and subsequent VOC vapor migration from groundwater into indoor air

Adding the estimated risks from the above-listed pathways (see Appendix F) to the potential on-site receptors as presented in the post-demolition risk assessment do not result in risks greater than the OEHHA-approved acceptable risk levels.

Groundwater Quality Impact Assessment

As indicated above, after review of the arsenic result for an onsite groundwater sample collected in October 2000, the RWQCB indicated in a letter dated March 14, 2001, that no additional soil or groundwater investigation is required on Parcel D with respect to arsenic.

Potential further degradation of groundwater due to VOC leaching from soil to groundwater is also evaluated herein. Results of our evaluation indicate that leaching of maximum onsite VOCs concentrations in soil would result in potential groundwater concentrations that are less than the California drinking water standards, specifically the Maximum Contaminant Levels (MCLs). Therefore, as indicated in Appendix F, the existing residual chemical concentrations in onsite deep soils do not pose a further threat to groundwater quality.

CONCLUSIONS AND RECOMMENDATIONS

Based on the closure evaluation presented herein, it is recommended that no further action be granted by the RWQCB for deep soil impacts at the subject parcel based on the following

conclusions.

1. A review of the results of the investigation and shallow soil remediation activities conducted at the subject parcel from 1999 through 2001 indicates that both the vertical and lateral extent of soil impacts have been delineated and removed as appropriate.

2. In a letter from the RWQCB dated February 25, 2000, the RWQCB concurred with completion of the arsenic-impacted shallow soil remediation activities, and in a letter dated March 14, 2001, the RWQCB indicated that no additional soil or groundwater investigation was required on Parcel D with respect to arsenic.

3. In a letter dated June 27, 2000, the DTSC indicated that it agreed with the conclusion that residual soil impacts do not pose health risks greater than acceptable levels. The results of the post-demolition risk assessment, approved by DTSC, indicated that the soil does not pose a risk to human health greater than acceptable levels from inhalation of VOCs from upward VOC vapor migration into onsite buildings.

4. Relatively low concentrations of phenol have been detected in onsite soil and relatively low concentrations of chloroform and PCE have been detected in onsite soil and groundwater. No source of phenol and chlorinated VOCs originating from the subject parcel has been identified. Chlorinated VOCs have been detected in groundwater migrating from the Montrose site onto the subject parcel. Thus, it appears that the concentrations of chlorinated VOCs and possibly phenol detected in onsite soil samples may be attributed to vapor migration from impacted groundwater and/or impacted soils that have migrated beneath the Montrose site to the subject parcel.

5. The following additional potential exposure pathways were evaluated after incorporating the January 2001 investigation results:

   - inhalation of VOCs in indoor air from upward VOC vapor migration from deep soil into onsite buildings

   - inhalation of VOCs in indoor air from upward VOC vapor migration from groundwater into onsite buildings

   - inhalation of VOCs in indoor air due to VOC migration from deep soil leachate migration to groundwater and subsequent VOC vapor migration from groundwater into indoor air

   Adding the estimated risks from the above-listed pathways to the potential on-site receptors as presented in the post-demolition risk assessment do not result in risks greater than the OEHHA-approved acceptable risk levels.

6. The existing residual chemical concentrations in onsite soils do not pose a threat to groundwater quality.

If you have any questions regarding the content of this letter, please contact either of the undersigned at (619) 280-9210.

Sincerely yours,
HALEY & ALDRICH, INC.

Anita Broughton, REA, CIH
Risk Assessment Task Manager

Richard M. Farson, P.E.
Senior Engineer

Scott Zachary
Project Manager

Attachments

List of Attachments

Appendix A
References

References

Camp Dresser & McKee, Inc. (CDM), 1991 (CDM 1991). *Phase I Environmental Assessment of the Douglas Aircraft Company C-6 Facility, Parking Lot and Tool Storage Yard, Los Angeles, CA.* June 13.

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Integrated, 1999 (Integrated 1999a). *Parcel D Sampling and Analysis Plan, Boeing Realty Corporation C-6 Facility, Los Angeles, California.* May.

Integrated, 1999 (Integrated 1996b). *Parcel D Site Investigation and Excavation Report, Boeing Realty Corporation C-6 Facility, Los Angeles, California.* October.

Regional Water Quality Control Board, Los Angeles Region (RWQCB), 1999 (RWQCB 1999). Letter prepared for the Parcel D Sampling and Analysis Plan, Boeing Realty Corporation (BRC) C-6 Facility, Los Angeles (File No. 100.315) (SLIC No. 410), May 27.

Integrated, 2000 (Integrated 2000). *Parcel D Post-Demolition Risk Assessment, Boeing Realty Corporation C-6 Facility, Los Angeles, California.* February.

RWQCB, 2000 (RWQCB 2000). Letter prepared entitled *Site Investigation and Excavation Report, Boeing Realty Corporation (BRC) C-6 Facility, Los Angeles (File No. 100.315) (SLIC No. 410)* documenting completion of the arsenic-impacted soil remediation activities and requesting monitoring for potential arsenic impacts to groundwater beneath Parcel D. February 25.

Department of Toxic Substances Control (DTSC) Human and Ecological Risk Division (HERD), 2000 (DTSC 2000). Letter prepared for the Boeing C-6 Facility, Parcel D, Los Angeles, California. June 27.

KJC, 2000 (KJC 2000a). *Boeing Realty Corporation's C-6 Facility, Los Angeles, California, Groundwater Monitoring Report, 2nd Quarter 2000.* July.

BRC, 2000a (BRC 2000a). Letter prepared entitled *Groundwater Monitoring Plan, Groundwater Investigation Work Plan, and Groundwater Investigation for Arsenic at Parcel D, Boeing Realty Corporation, Former C-6 Facility, 19503 South Normandie Avenue, Los Angeles.* October 17.

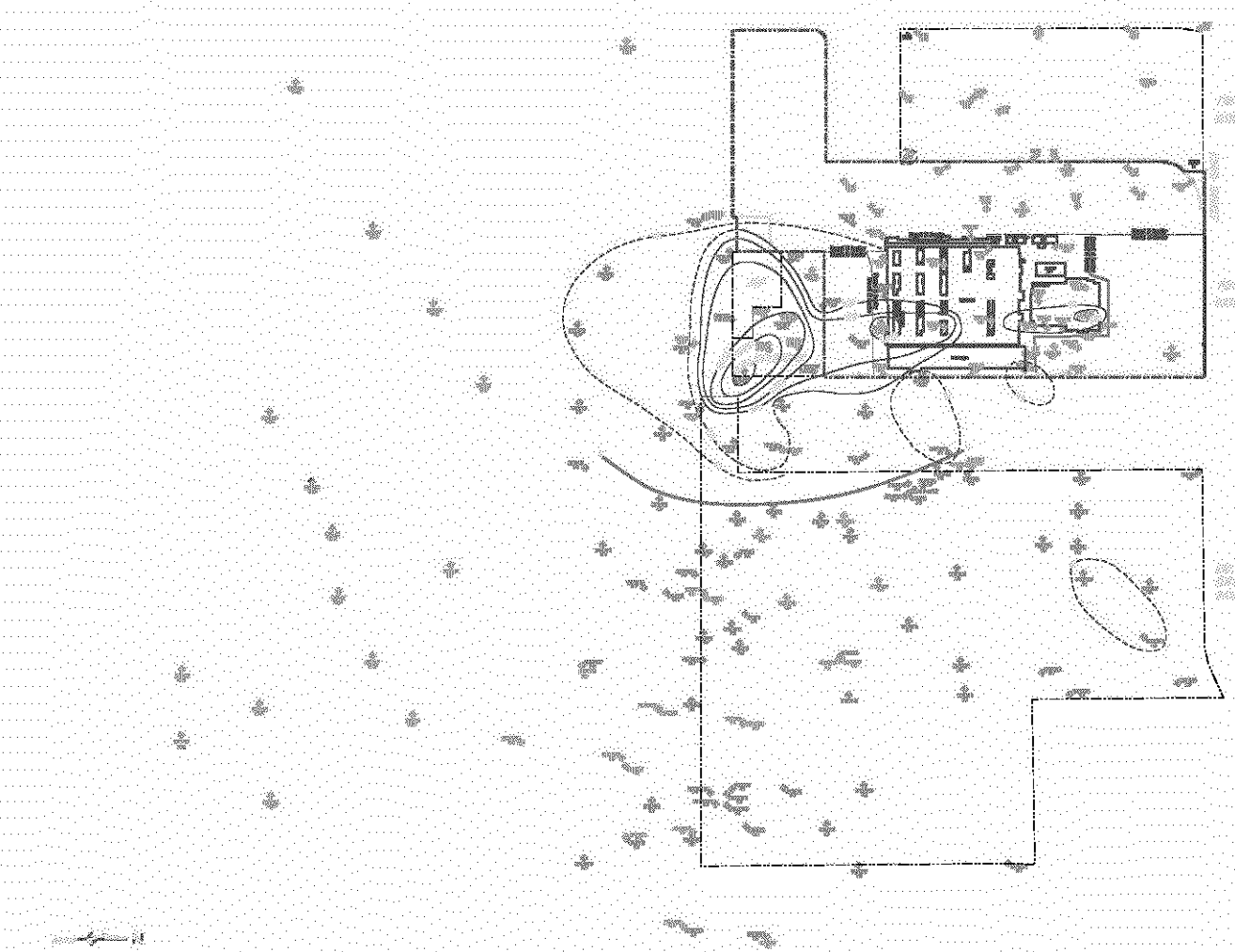
KJC, 2000 (KJC 2000b). *Boeing Realty Corporation, Groundwater Status Report, Former C-6 Facility, Los Angeles, California.* October 27.

BRC, 2000 (BRC 2000b). *Letter* prepared entitled *Arsenic Results for Montrose Well XMW-09 for Boeing Realty Corporation, Former C-6 Facility, 19503 South Normandie Avenue, Los Angeles.* November 28.

RWQCB, 2001 (RWCB 2001a). Letter prepared entitled *No Further Action For Shallow Soils, Parcel D, Former Boeing C-6 Facility, Torrance (File No. 95-036.* January 5.

RWQCB, 2001 (RWQCB 2001b). Letter prepared entitled *Results of Investigation to Determine Presence of Arsenic in Groundwater Beneath Parcel D, Former C-6 Facility, Boeing Realty Corporation (File No. 95-036.* March 14.

Appendix B
Figure 10 of K/J 2000b



GROUNDWATER MONITORING LOCATION WITH THE CONCENTRATION OF CHLOROFORM (UG/L) FOR THE SAMPLING PERIOD SHOWN (CONCENTRATIONS, IN PARENTHESES INDICATE HISTORICAL DATA FROM THE MONITORS SITE.

GROUNDWATER MONITORING LOCATION WITH THE CONCENTRATION OF CHLOROFORM (UG/L) FOR THE SAMPLING PERIOD SHOWN (CONCENTRATIONS, IN PARENTHESES INDICATE HISTORICAL DATA FROM THE MONITORS SITE.

ABANDONED WELL AT THE FORMER C-6 AND TOASTER AS OF JULY 2000.

DEEP SOIL BORING FORMER INTERPRETATION SLUG-IT METALS.

CHLOROFORM CONCENTRATION REPORTED IN UG/L.

ND INDICATES CHLOROFORM WAS NOT DETECTED ABOVE THE DETECTION LIMIT. LIMIT NOT KNOWN.

ND INDICATES CHLOROFORM WAS NOT DETECTED ABOVE THE DETECTION LIMIT. LIMIT SHOWN.

INFERRED INTERSECTION OF WATER TABLE SURFACE WITH TOP OF MCGILL SILT/FLOWER SILT/SAND. THE OVERLYING UPPER FELL FLOWER SILT/SAND IS UNSATURATED WEST OF THE INFERRED INTERSECTION.

REFERENCE: FORMER INDUSTRIAL LIGHT METALS (ITIC, 1999 - TABLE 4.10)
FORMER C-6 SITE (KENNEDY/JENKS CONSULTANTS, 2000 - TABLE 2)
DEL AMO STUDY AREA (DAMES & MOORE, 1997 - FIGURES 7, 13, 17 AND 21)

Approximate Scale: 1"=200'

USE OF DOCUMENTS

NO.	REVISION	BY	DATE

SCALES
0 ——— 1"
0 ——— 80mm

DESIGNED	PM
DRAWN	MR
CHECKED	PM

BOEING REALTY CORPORATION
FORMER C-6 FACILITY
GROUNDWATER STATUS REPORT

Kennedy/Jenks Consultants
200 Wilshire Blvd, Suite 220, Irvine, California 92614

CHLOROFORM IN GROUNDWATER
COMPOSITE MAP
SHALLOW GROUNDWATER SYSTEM

JOB NO.	800-C6000
DATE	October 2000
SHEET NO.	10

Appendix C
Laboratory Report – October 2000 Groundwater Sampling Event

SEVERN TRENT SERVICES

STL Los Angeles
1721 South Grand Avenue
Santa Ana, CA 92705-4808

Tel: 714 258 8610
Fax: 714 258 0921
www.stl-inc.com

November 1, 2000

STL LOT NUMBER: **E0J120322**

Rus Purcell
Kennedy/Jenks Consultants
2151 Michelson Drive
Suite 100
Irvine, CA 92612

Dear Mr. Purcell,

This report contains the analytical results for the sample received under chain of custody by STL Los Angeles on October 12, 2000. This sample is associated with your Boeing C6 project.

All applicable quality control procedures met method-specified acceptance criteria. Matrix related anomalies are footnoted within the report.

This report shall not be reproduced except in full, without the written approval of the laboratory.

If you have any questions, please feel free to call me at 714-258-8610.

Sincerely,

Diane Suzuki
Project Manager

cc: Project File

KENNEDY/JENKS CONSULTANTS ~~EOJ120322~~ ~~EOJ120320~~

☐ 200 New Stine Rd., #116, Bakersfield, CA 93309
☐ 530 South 336th St., Federal Way, WA 98003
☐ 17310 Red Hill Ave., #220, Irvine, CA 92714
☐ 2191 East Bayshore Rd., #200, Palo Alto, CA 94303
☐ 6190 Neil Road, #300, Reno, NV 89502
☐ 3336 Bradshaw Rd., #140, Sacramento, CA 95827
☐ 303 Second St., San Francisco, CA 94107
☐ 1000 Hill Rd., #200, Ventura, CA 93003

SAMPLE CHAIN-OF-CUSTODY ANALYSIS REQUEST

EOJ120322

POSSIBLE HAZARDS: _____

Date 10-12-00 | Report To Pete Murphy | Lab Destination STL Labs

Source of Samples Boeing Parcel C | Company Kennedy / Jenks | Address L.A.

Sampler Name Shane Scrimshire | Address 2151 Michelsen Dr. #100 | _____

Phone 661-835-9785 | Irvine CA. 92612 | Phone _____

Project No. 0040.20.00 | Phone 949-261-1577 | Carrier/Way Bill No. _____

(1) Lab ID No.	(1) Client ID No.	COLLECTION Date	COLLECTION Time	(2) Type	Depth	(3) Comp.	(4) Pres.	Turn-around	(5) ANALYSES REQUESTED: Arsenic (Dissolved)	9260							Comment/Conditions (Container type, container number, etc.)
1	MW-9-101200	10/12/00	1340	W	—	—		Rush	X	X							3-VOAS + 1-1000 ML Plastic

(1) Write only one sample number in each space.
(2) Specify type of sample(s): Water (W), Solid (S), or indicate type.
(3) Mark each sample which should be composited in Laboratory as follows: Place an "A" in box for each sample that should be composited into one sample; use sequential letter for additional groups.
(4) Preservation of sample.
(5) Write each analyses requested across top. Place an "X" in appropriate column to indicate type of analysis needed for each sample.

SAMPLE RELINQUISHED BY: | SAMPLE RECEIVED BY:

Print Name	Signature	Company	Date	Time	Print Name	Signature	Company	Date	Time
Shane Scrimshire		K/J	10/12/00	1600	D Suzuki		STL		1650

\MISC\CUSTODY2.FRM

000065.06

BOE-C6-0000104

000002

STL – LOS ANGELES
PROJECT RECEIPT CHECKLIST

Date: 10-12-00

Quantims Lot #: EOJ120322 | Quote #:

Client Name: Kennedy Jenks | Project: 004020-00

Received by: AV | Date/Time Received: 10/12 16:50

Delivered by : ☐Client ☐Airborne ☐Fed Ex ☐DHL ☐Ultra-Ex ☐Rey B.
☐UPS ☒DES ☐Other

	Initial / Date
Custody Seal Status: ☐Intact ☐Broken ☒None	AV 10/12
Custody Seal #(s): ☐No Seal #	
Sample Container(s): ☐STL-LA ☐Client ☐N/A	
Temperature(s) (COOLER/BLANK) in °C: 6.0 NO TB/BLK (CORRECTED TEMP)	
Thermometer Used : ☒IR (Infra-red) ☐Digital (Probe)	
Samples: ☒Intact ☐Broken ☐Other	
Anomalies: ☒No ☐Yes (See Clouseau)	
Labeled by	
Labeling checked by	
Turn Around Time: ☐RUSH–24HR ☐RUSH–48HR ☒RUSH–72HR ☐NORMAL	AV 10/12
Short-Hold Notification: ☐Ph ☐Wet Chem ☐Metals (Filter/Pres) ☐Encore ☐N/A	
Outside Analysis(es) (Test/Lab/Date Sent Out) :	

•••••••••• LEAVE NO BLANK SPACES ; USE N/A ••••••••••

Fraction	1										PH
VOAh I*	3										N/A
1LT PB	1										

h: HCl sa: Sodium Hydroxide zaa: Zinc Acetate/Sodium Hydroxide s: H2SO4 n: HNO3 nf: HNO3-Field filtered nl: HNO3-Lab filtered
CGJ: Clear Glass Jar CGB: Clear Glass Bottle AGJ: Amber Glass Jar AGB: Amber Glass Bottle PB: Poly Bottle E: Encore Sampler V: VOA

* Number of VOA's w/ Headspace present

LOGGED BY/DATE: MC 10/12/00 REVIEWED BY/DATE: [signature] 10/12/00

000003

EXECUTIVE SUMMARY - Detection Highlights

E0J120322

PARAMETER	RESULT	REPORTING LIMIT	UNITS	ANALYTICAL METHOD
MW-9-101200 10/12/00 13:40 001				
Chlorobenzene	190	25	ug/L	SW846 8260B
Chloroform	1500	25	ug/L	SW846 8260B
Tetrachloroethene	55	25	ug/L	SW846 8260B
Trichloroethene	9.8 J	25	ug/L	SW846 8260B

METHODS SUMMARY

E0J120322

PARAMETER	ANALYTICAL METHOD	PREPARATION METHOD
Inductively Coupled Plasma (ICP) Metals	SW846 6010B	SW846 3005A
Volatile Organics by GC/MS	SW846 8260B	SW846 5030B/826

References:

SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

SAMPLE SUMMARY

E0J120322

WO #	SAMPLE#	CLIENT SAMPLE ID	DATE	TIME
DM3H8	001	MW-9-101200	10/12/00	13:40

NOTE(S):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

KENNEDY/JENKS CONSULTANTS

Client Sample ID: MW-9-101200

GC/MS Volatiles

Lot-Sample #...: E0J120322-001 **Work Order #...:** DM3H81AD **Matrix.....:** WATER
Date Sampled...: 10/12/00 13:40 **Date Received..:** 10/12/00 16:50 **MS Run #.....:** 0290179
Prep Date.....: 10/15/00 **Analysis Date..:** 10/15/00
Prep Batch #...: 0290617 **Analysis Time..:** 20:58
Dilution Factor: 25
Analyst ID.....: 004648 **Instrument ID..:** MSC
Method.....: SW846 8260B

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
Acetone	ND	250	ug/L	75
Benzene	ND	25	ug/L	7.5
Bromobenzene	ND	25	ug/L	7.5
1-Bromo-2-chloroethane	ND	25	ug/L	12
Bromochloromethane	ND	25	ug/L	7.5
Bromoform	ND	25	ug/L	7.5
Bromomethane	ND	50	ug/L	25
2-Butanone	ND	120	ug/L	75
n-Butylbenzene	ND	25	ug/L	7.5
sec-Butylbenzene	ND	25	ug/L	7.5
tert-Butylbenzene	ND	25	ug/L	5.0
Carbon disulfide	ND	25	ug/L	7.5
Carbon tetrachloride	ND	25	ug/L	7.5
Chlorobenzene	**190**	**25**	**ug/L**	**7.5**
Dibromochloromethane	ND	25	ug/L	7.5
Bromodichloromethane	ND	25	ug/L	7.5
Chloroethane	ND	50	ug/L	7.5
Chloroform	**1500**	**25**	**ug/L**	**5.0**
Chloromethane	ND	50	ug/L	7.5
2-Chlorotoluene	ND	25	ug/L	7.5
4-Chlorotoluene	ND	25	ug/L	7.5
1,2-Dibromo-3-chloropropane	ND	50	ug/L	15
1,2-Dibromoethane	ND	25	ug/L	7.5
Dibromomethane	ND	25	ug/L	7.5
1,2-Dichlorobenzene	ND	25	ug/L	5.0
1,3-Dichlorobenzene	ND	25	ug/L	5.0
1,4-Dichlorobenzene	ND	25	ug/L	7.5
Dichlorodifluoromethane	ND	50	ug/L	10
1,1-Dichloroethane	ND	25	ug/L	5.0
1,2-Dichloroethane	ND	25	ug/L	5.0
1,1-Dichloroethene	ND	25	ug/L	5.0
cis-1,2-Dichloroethene	ND	25	ug/L	7.5
trans-1,2-Dichloroethene	ND	25	ug/L	5.0
1,2-Dichloropropane	ND	25	ug/L	5.0
1,3-Dichloropropane	ND	25	ug/L	10
2,2-Dichloropropane	ND	25	ug/L	7.5

(Continued on next page)

KENNEDY/JENKS CONSULTANTS

Client Sample ID: MW-9-101200

GC/MS Volatiles

Lot-Sample #...: E0J120322-001 **Work Order #...:** DM3H81AD **Matrix.....:** WATER

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
1,1-Dichloropropene	ND	25	ug/L	7.5
cis-1,3-Dichloropropene	ND	25	ug/L	7.5
trans-1,3-Dichloropropene	ND	25	ug/L	12
Ethylbenzene	ND	25	ug/L	5.0
Hexachlorobutadiene	ND	25	ug/L	7.5
2-Hexanone	ND	120	ug/L	50
Isopropylbenzene	ND	25	ug/L	5.0
p-Isopropyltoluene	ND	25	ug/L	5.0
Methylene chloride	ND	25	ug/L	5.0
4-Methyl-2-pentanone	ND	120	ug/L	50
Methyl tert-butyl ether	ND	25	ug/L	12
Naphthalene	ND	25	ug/L	10
n-Propylbenzene	ND	25	ug/L	10
Styrene	ND	25	ug/L	7.5
1,1,1,2-Tetrachloroethane	ND	25	ug/L	7.5
1,1,2,2-Tetrachloroethane	ND	25	ug/L	7.5
Tetrachloroethene	**55**	**25**	**ug/L**	**18**
Toluene	ND	25	ug/L	7.5
1,2,3-Trichlorobenzene	ND	25	ug/L	10
1,2,4-Trichloro-benzene	ND	25	ug/L	7.5
1,1,1-Trichloroethane	ND	25	ug/L	5.0
1,1,2-Trichloroethane	ND	25	ug/L	7.5
Trichloroethene	**9.8 J**	**25**	**ug/L**	**7.5**
Trichlorofluoromethane	ND	50	ug/L	5.0
1,2,3-Trichloropropane	ND	25	ug/L	7.5
1,1,2-Trichlorotrifluoro-ethane	ND	25	ug/L	5.0
1,2,4-Trimethylbenzene	ND	25	ug/L	5.0
1,3,5-Trimethylbenzene	ND	25	ug/L	5.0
Vinyl chloride	ND	50	ug/L	7.5
m-Xylene & p-Xylene	ND	25	ug/L	12
o-Xylene	ND	25	ug/L	5.0
Xylenes (total)	ND	25	ug/L	12
Tert-amyl methyl ether	ND	50	ug/L	12
Tert-butyl ethyl ether	ND	50	ug/L	12
t-Butanol	ND	620	ug/L	150
Isopropyl ether	ND	50	ug/L	12
Acrolein	ND	500	ug/L	300
Iodomethane	ND	120	ug/L	25
Acrylonitrile	ND	500	ug/L	250
Vinyl acetate	ND	120	ug/L	25
Tetrahydrofuran	ND	250	ug/L	50

(Continued on next page)

KENNEDY/JENKS CONSULTANTS

Client Sample ID: MW-9-101200

GC/MS Volatiles

Lot-Sample #...: E0J120322-001 **Work Order #...:** DM3H81AD **Matrix.....:** WATER

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
2-Chloroethyl vinyl ether	ND	120	ug/L	50

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Bromofluorobenzene	97	(75 - 120)
1,2-Dichloroethane-d4	109	(65 - 130)
Toluene-d8	100	(80 - 130)

NOTE(S):

J Estimated result. Result is less than RL.

KENNEDY/JENKS CONSULTANTS

MW-9-101200

GC/MS Volatiles

Lot-Sample #: E0J120322-001 **Work Order #:** DM3H81AD **Matrix:** WATER

MASS SPECTROMETER/DATA SYSTEM (MSDS) TENTATIVELY IDENTIFIED COMPOUNDS

PARAMETER	CAS #	ESTIMATED RESULT	RETENTION TIME	UNITS
None				ug/L

KENNEDY/JENKS CONSULTANTS

Client Sample ID: MW-9-101200

DISSOLVED Metals

Lot-Sample #...: E0J120322-001 **Matrix.....:** WATER
Date Sampled...: 10/12/00 13:40 **Date Received..:** 10/12/00 16:50

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 0288128						
Arsenic	ND	0.010	mg/L	SW846 6010B	10/14-10/16/00	DM3H81AC
		Dilution Factor: 1		Analysis Time..: 19:32	Analyst ID.....: 003119	
		Instrument ID..: M01		MS Run #.....: 0288033	MDL.....: 0.0040	

QC DATA ASSOCIATION SUMMARY

E0J120322

Sample Preparation and Analysis Control Numbers

SAMPLE#	MATRIX	ANALYTICAL METHOD	LEACH BATCH #	PREP BATCH #	MS RUN#
001	WATER	SW846 8260B		0290617	0290179
	WATER	SW846 6010B		0288128	0288033

METHOD BLANK REPORT

GC/MS Volatiles

Client Lot #...: E0J120322 **Work Order #...:** DM8QM1AA **Matrix.....:** WATER
MB Lot-Sample #: E0J160000-617

Prep Date.....: 10/15/00 **Analysis Time..:** 12:54
Analysis Date..: 10/15/00 **Prep Batch #...:** 0290617 **Instrument ID..:** MSC
Dilution Factor: 1

Analyst ID.....: 004648

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD
Acetone	ND	10	ug/L	SW846 8260B
Benzene	ND	1.0	ug/L	SW846 8260B
Bromobenzene	ND	1.0	ug/L	SW846 8260B
1-Bromo-2-chloroethane	ND	1.0	ug/L	SW846 8260B
Bromochloromethane	ND	1.0	ug/L	SW846 8260B
Bromoform	ND	1.0	ug/L	SW846 8260B
Bromomethane	ND	2.0	ug/L	SW846 8260B
2-Butanone	ND	5.0	ug/L	SW846 8260B
n-Butylbenzene	ND	1.0	ug/L	SW846 8260B
sec-Butylbenzene	ND	1.0	ug/L	SW846 8260B
tert-Butylbenzene	ND	1.0	ug/L	SW846 8260B
Carbon disulfide	ND	1.0	ug/L	SW846 8260B
Carbon tetrachloride	ND	1.0	ug/L	SW846 8260B
Chlorobenzene	ND	1.0	ug/L	SW846 8260B
Dibromochloromethane	ND	1.0	ug/L	SW846 8260B
Bromodichloromethane	ND	1.0	ug/L	SW846 8260B
Chloroethane	ND	2.0	ug/L	SW846 8260B
Chloroform	ND	1.0	ug/L	SW846 8260B
Chloromethane	ND	2.0	ug/L	SW846 8260B
2-Chlorotoluene	ND	1.0	ug/L	SW846 8260B
4-Chlorotoluene	ND	1.0	ug/L	SW846 8260B
1,2-Dibromo-3-chloro-propane	ND	2.0	ug/L	SW846 8260B
1,2-Dibromoethane	ND	1.0	ug/L	SW846 8260B
Dibromomethane	ND	1.0	ug/L	SW846 8260B
1,2-Dichlorobenzene	ND	1.0	ug/L	SW846 8260B
1,3-Dichlorobenzene	ND	1.0	ug/L	SW846 8260B
1,4-Dichlorobenzene	ND	1.0	ug/L	SW846 8260B
Dichlorodifluoromethane	ND	2.0	ug/L	SW846 8260B
1,1-Dichloroethane	ND	1.0	ug/L	SW846 8260B
1,2-Dichloroethane	ND	1.0	ug/L	SW846 8260B
1,1-Dichloroethene	ND	1.0	ug/L	SW846 8260B
cis-1,2-Dichloroethene	ND	1.0	ug/L	SW846 8260B
trans-1,2-Dichloroethene	ND	1.0	ug/L	SW846 8260B
1,2-Dichloropropane	ND	1.0	ug/L	SW846 8260B
1,3-Dichloropropane	ND	1.0	ug/L	SW846 8260B
2,2-Dichloropropane	ND	1.0	ug/L	SW846 8260B
1,1-Dichloropropene	ND	1.0	ug/L	SW846 8260B
cis-1,3-Dichloropropene	ND	1.0	ug/L	SW846 8260B
trans-1,3-Dichloropropene	ND	1.0	ug/L	SW846 8260B

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METHOD BLANK REPORT

GC/MS Volatiles

Client Lot #...: E0J120322 **Work Order #...:** DM8QM1AA **Matrix.....:** WATER

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD
Ethylbenzene	ND	1.0	ug/L	SW846 8260B
Hexachlorobutadiene	ND	1.0	ug/L	SW846 8260B
2-Hexanone	ND	5.0	ug/L	SW846 8260B
Isopropylbenzene	ND	1.0	ug/L	SW846 8260B
p-Isopropyltoluene	ND	1.0	ug/L	SW846 8260B
Methylene chloride	ND	1.0	ug/L	SW846 8260B
4-Methyl-2-pentanone	ND	5.0	ug/L	SW846 8260B
Methyl tert-butyl ether	ND	1.0	ug/L	SW846 8260B
Naphthalene	ND	1.0	ug/L	SW846 8260B
n-Propylbenzene	ND	1.0	ug/L	SW846 8260B
Styrene	ND	1.0	ug/L	SW846 8260B
1,1,1,2-Tetrachloroethane	ND	1.0	ug/L	SW846 8260B
1,1,2,2-Tetrachloroethane	ND	1.0	ug/L	SW846 8260B
Tetrachloroethene	ND	1.0	ug/L	SW846 8260B
Toluene	ND	1.0	ug/L	SW846 8260B
1,2,3-Trichlorobenzene	ND	1.0	ug/L	SW846 8260B
1,2,4-Trichloro-benzene	ND	1.0	ug/L	SW846 8260B
1,1,1-Trichloroethane	ND	1.0	ug/L	SW846 8260B
1,1,2-Trichloroethane	ND	1.0	ug/L	SW846 8260B
Trichloroethene	ND	1.0	ug/L	SW846 8260B
Trichlorofluoromethane	ND	2.0	ug/L	SW846 8260B
1,2,3-Trichloropropane	ND	1.0	ug/L	SW846 8260B
1,1,2-Trichlorotrifluoro-ethane	ND	1.0	ug/L	SW846 8260B
1,2,4-Trimethylbenzene	ND	1.0	ug/L	SW846 8260B
1,3,5-Trimethylbenzene	ND	1.0	ug/L	SW846 8260B
Vinyl chloride	ND	2.0	ug/L	SW846 8260B
m-Xylene & p-Xylene	ND	1.0	ug/L	SW846 8260B
o-Xylene	ND	1.0	ug/L	SW846 8260B
Xylenes (total)	ND	1.0	ug/L	SW846 8260B
Tert-amyl methyl ether	ND	2.0	ug/L	SW846 8260B
Tert-butyl ethyl ether	ND	2.0	ug/L	SW846 8260B
t-Butanol	ND	25	ug/L	SW846 8260B
Isopropyl ether	ND	2.0	ug/L	SW846 8260B
Acrolein	ND	20	ug/L	SW846 8260B
Iodomethane	ND	5.0	ug/L	SW846 8260B
Acrylonitrile	**81**	**20**	**ug/L**	**SW846 8260B**
Vinyl acetate	ND	5.0	ug/L	SW846 8260B
Tetrahydrofuran	ND	10	ug/L	SW846 8260B
2-Chloroethyl vinyl ether	ND	5.0	ug/L	SW846 8260B

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Bromofluorobenzene	99	(75 - 120)

(Continued on next page)

METHOD BLANK REPORT

GC/MS Volatiles

Client Lot #...: E0J120322 **Work Order #...:** DM8QM1AA **Matrix.....:** WATER

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD
1,2-Dichloroethane-d4	96	(65 - 130)		
Toluene-d8	100	(80 - 130)		

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

METHOD BLANK REPORT

DISSOLVED Metals

Client Lot #...: E0J120322 **Matrix.....:** WATER

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
MB Lot-Sample #: E0J140000-128 **Prep Batch #...:** 0288128						
Arsenic	ND	0.010	mg/L	SW846 6010B	10/14-10/16/00	DM60E1AD

Dilution Factor: 1

Analysis Time..: 16:42 Analyst ID.....: 003119 Instrument ID..: M01

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

LABORATORY CONTROL SAMPLE DATA REPORT

GC/MS Volatiles

Client Lot #...: E0J120322 Work Order #...: DM8QM1AC Matrix.....: WATER
LCS Lot-Sample#: E0J160000-617
Prep Date.....: 10/15/00 Analysis Date..: 10/15/00
Prep Batch #...: 0290617 Analysis Time..: 11:45
Dilution Factor: 1 Instrument ID..: MSC
Analyst ID.....: 004648

PARAMETER	SPIKE AMOUNT	MEASURED AMOUNT	UNITS	PERCENT RECOVERY	METHOD
Benzene	**10.0**	**9.24**	**ug/L**	**92**	**SW846 8260B**
Chlorobenzene	**10.0**	**8.81**	**ug/L**	**88**	**SW846 8260B**
1,1-Dichloroethene	**10.0**	**9.86**	**ug/L**	**99**	**SW846 8260B**
Toluene	**10.0**	**9.19**	**ug/L**	**92**	**SW846 8260B**
Trichloroethene	**10.0**	**8.64**	**ug/L**	**86**	**SW846 8260B**

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Bromofluorobenzene	100	(75 - 120)
1,2-Dichloroethane-d4	98	(65 - 130)
Toluene-d8	104	(80 - 130)

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

LABORATORY CONTROL SAMPLE DATA REPORT

DISSOLVED Metals

Client Lot #...: E0J120322 **Matrix.....:** WATER

PARAMETER	SPIKE AMOUNT	MEASURED AMOUNT	UNITS	PERCNT RECVRY	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
LCS Lot-Sample#: E0J140000-128 **Prep Batch #...:** 0288128							
Arsenic	2.00	1.81	mg/L	91	SW846 6010B	10/14-10/16/00	DM60E1A1

Dilution Factor: 1

Analysis Time..: 16:48 Analyst ID.....: 3119 Instrument ID..: M01

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

LABORATORY CONTROL SAMPLE EVALUATION REPORT

GC/MS Volatiles

Client Lot #...: E0J120322 **Work Order #...:** DM8QM1AC **Matrix.....:** WATER
LCS Lot-Sample#: E0J160000-617
Prep Date.....: 10/15/00 **Analysis Date..:** 10/15/00
Prep Batch #...: 0290617 **Analysis Time..:** 11:45
Dilution Factor: 1 **Instrument ID..:** MSC
Analyst ID.....: 004648

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	METHOD
Benzene	**92**	**(75 - 120)**	**SW846 8260B**
Chlorobenzene	**88**	**(80 - 120)**	**SW846 8260B**
1,1-Dichloroethene	**99**	**(70 - 130)**	**SW846 8260B**
Toluene	**92**	**(80 - 120)**	**SW846 8260B**
Trichloroethene	**86**	**(75 - 130)**	**SW846 8260B**

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Bromofluorobenzene	100	(75 - 120)
1,2-Dichloroethane-d4	98	(65 - 130)
Toluene-d8	104	(80 - 130)

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

LABORATORY CONTROL SAMPLE EVALUATION REPORT

DISSOLVED Metals

Client Lot #...: E0J120322 **Matrix.....:** WATER

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
LCS Lot-Sample#: E0J140000-128 **Prep Batch #...:** 0288128					
Arsenic	91	(80 - 120)	SW846 6010B	10/14-10/16/00	DM60E1A1

Dilution Factor: 1

Analysis Time..: 16:48 Analyst ID.....: 3119 Instrument ID..: M01

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Appendix D
Laboratory Report – January 2001 Soil Sampling Event

SEVERN
TRENT
SERVICES

STL Los Angeles
1721 South Grand Avenue
Santa Ana, CA 92705-4808

Tel: 714 258 8610
Fax: 714 258 0921
www.stl-inc.com

February 8, 2001

STL LOT NUMBER: **E1A290176**
PO/CONTRACT: 05160-SEV002

Rus Purcell
Kennedy/Jenks Consultants
2151 Michelson Drive
Suite 100
Irvine, CA 92612

Dear Mr. Purcell,

This report contains the analytical results for the 31 samples received under chain of custody by STL Los Angeles on January 29, 2001. These samples are associated with your BRC, former C-6 torrance harbor Gateway project.

All applicable quality control procedures meet method-specified acceptance criteria. See Project Receipt Checklist for container temperature and conditions. Temperature reading beyond 2 to 6 degrees Celsius is considered not within acceptable criteria unless otherwise noted such as limited transit time from field and test requested. Any matrix related anomaly is footnoted within the report.

STL Los Angeles certifies that the test results provided in this report meet all the requirements of NELAC. This report shall not be reproduced except in full, without the written approval of the laboratory.

If you have any questions, please feel free to call me at 714-258-8610.

Sincerely,

Diane Suzuki
Project Manager

cc: Project File

No. 202639

SEVERN TRENT LABORATORIES

Committed To Your Success

CHAIN OF CUSTODY RECORD

CUSTOMER INFORMATION	PROJECT INFORMATION
COMPANY: Kennedy Jenks	PROJECT NAME/NUMBER: 004032.01
SEND REPORT TO: Jay Knight	**BILLING INFORMATION**
ADDRESS: 2151 Michelson Dr. Ste 100	BILL TO:
Irvine, Ca 92612	ADDRESS:
PHONE: 949-261-1577	PHONE:
FAX:	FAX: PO NO.:

SAMPLE NO.	SAMPLE DESCRIPTION	SAMPLE DATE	SAMPLE TIME	SAMPLE MATRIX	CONTAINER	PRESERV.	NUMBER OF CONTAINERS	ANALYSIS / METHOD REQUEST: 8260 VOC	6010 Metals	8015 TPH	GEOTECH	LAB JOB NO.	REMARKS/PRECAUTIONS
	I-34-5	1/29/01	7:30	Soil	SS	ICE	1		X	X	X		
	-10		7:35				1	X					
	-15		7:45				1	X					
	-20		8:00				2				X		
	-30		8:25				1	X					
	-40		8:35				1	X					
	-50		8:40				2				X		
	-60		8:45	Soil	SS	ICE	1	X					
	I-34-W ~~Misc~~		9:10	W	Bottle	Nitric Acid	1	8	X				
	I-34-W	1/29/01	9:10	W	VOA	HCL	3	X					

SAMPLER: Timi

SHIPMENT METHOD:

AIRBILL NO.:

REQUIRED TURNAROUND* ☐ SAME DAY ☐ 24 HOURS ☐ 48 HOURS ☐ 72 HOURS ☒ 5 DAYS ☐ 10 DAYS ☐ ROUTINE ☐ OTHER

1. RELINQUISHED BY: SIGNATURE: Timi Doyle	DATE 1/29/01	2. RELINQUISHED BY: SIGNATURE:	DATE 1-29-01	3. RELINQUISHED BY: SIGNATURE:	DATE
PRINTED NAME/COMPANY: Timi Doyle KJ	TIME 1615	PRINTED NAME/COMPANY: SR	TIME 1731	PRINTED NAME/COMPANY:	TIME
1. RECEIVED BY: SIGNATURE:	DATE 1-29-01	2. RECEIVED BY: SIGNATURE:	DATE 1/29/01	3. RECEIVED BY: SIGNATURE:	DATE
PRINTED NAME/COMPANY: SR	TIME 1615	PRINTED NAME/COMPANY: STL	TIME 17:35	PRINTED NAME/COMPANY:	TIME

* RUSH TURNAROUND MAY REQUIRE SURCHARGE

SEVERN TRENT LABORATORIES
1721 South Grand Avenue
Santa Ana, CA 92705
Phone: (714) 258-8610 / Fax: (714) 258-0921

000002

BOE-C6-0000125

SEVERN TRENT LABORATORIES

Committed To Your Success

No. 202640

CHAIN OF CUSTODY RECORD

CUSTOMER INFORMATION	PROJECT INFORMATION
COMPANY: Kennedy Jenks	PROJECT NAME/NUMBER: 24032.01
SEND REPORT TO: Jay Knight	**BILLING INFORMATION**
ADDRESS: 2151 Michelson Dr Ste 100	BILL TO:
Irvine, Ca 92612	ADDRESS:
PHONE: 949-261-1577	PHONE:
FAX:	FAX: PO NO.:

SAMPLE NO.	SAMPLE DESCRIPTION	SAMPLE DATE	SAMPLE TIME	SAMPLE MATRIX	CONTAINER	PRESERV.	NUMBER OF CONTAINERS	ANALYSIS / METHOD REQUEST: 8260 VOC	1010 M	8015 TPH Gas/Tech						REMARKS/PRECAUTIONS
	D-29-5	1/29/01	10:00	Soil	SS	ICE	1		X	X	X					
	-15		10:10				1	X								
	-20		10:15				2				X					
	-30		10:20				1	X								
	-40		10:30				1	X								
	-50		10:40				2				X					
	-60		10:50	Soil	SS	ICE	1	X								
	D-29-W		12:30	W	Bottle	Nitric Acid	1		X							
	D-29-W		12:30	W	VOA	HCL	3	X								
	I-25-5	1/29	12:55	Soil	SS	ICE	2		X	X	X					

SAMPLER: Tim

SHIPMENT METHOD:

AIRBILL NO.:

REQUIRED TURNAROUND* ☐ SAME DAY ☐ 24 HOURS ☐ 48 HOURS ☐ 72 HOURS ☐ 5 DAYS ☐ 10 DAYS ☐ ROUTINE ☐ OTHER

1. RELINQUISHED BY:	DATE	2. RELINQUISHED BY:	DATE	3. RELINQUISHED BY:	DATE
SIGNATURE: Tim Doyle	1/29/01	SIGNATURE:	1735	SIGNATURE:	
PRINTED NAME/COMPANY: Tim Doyle KJ	TIME 1605	PRINTED NAME/COMPANY: SR	TIME 1-29-01	PRINTED NAME/COMPANY:	TIME
1. RECEIVED BY:	DATE	2. RECEIVED BY:	DATE	3. RECEIVED BY:	DATE
SIGNATURE:	1-29-01	SIGNATURE:	1-29-01	SIGNATURE:	
PRINTED NAME/COMPANY: SR	TIME (5:30)	PRINTED NAME/COMPANY:	TIME 17:35	PRINTED NAME/COMPANY:	TIME

* RUSH TURNAROUND MAY REQUIRE SURCHARGE

SEVERN TRENT LABORATORIES
1721 South Grand Avenue
Santa Ana, CA 92705
Phone: (714) 258-8610 / Fax: (714) 258-0921

SEVERN TRENT LABORATORIES

Committed To Your Success

No. 202642

CHAIN OF CUSTODY RECORD

BOE-C6-0000127

CUSTOMER INFORMATION	PROJECT INFORMATION
COMPANY: Kennedy Jenks	PROJECT NAME/NUMBER: 0403201
SEND REPORT TO: Jay Knight	**BILLING INFORMATION**
ADDRESS: 2151 Michelson Dr. Ste 100	BILL TO:
Irvine Ca 92612	ADDRESS:
PHONE: 949-261-1577	PHONE:
FAX:	FAX: PO NO.:

SAMPLE NO.	SAMPLE DESCRIPTION	SAMPLE DATE	SAMPLE TIME	SAMPLE MATRIX	CONTAINER	PRESERV.	NUMBER OF CONTAINERS	ANALYSIS / METHOD REQUEST: 8260 VOC	6010 Metals	8015 TPH Gasoline						REMARKS/PRECAUTIONS
	I-25-10	1/29/01	12:55	Soil	SS	ICE	1		X	X						
	-15		13:05				1	X								
	-20		13:10				2				X					
	-30		13:15				1	X								
	-40		13:20				1	X								
	-50		13:25				2				X					
	-60		13:30	Soil	SS	ICE	1	X								
	I-25-W		13:50	W	Bottle	Nitric Acid	1		X							
	I-25-W		13:50	W	VOA	HCL	3	X								
	D-T-35	1/29/01	15:25	Soil	SS	ICE	1	X								

LAB JOB NO.:

SAMPLER: Tim

SHIPMENT METHOD:

AIRBILL NO.:

REQUIRED TURNAROUND* ☐ SAME DAY ☐ 24 HOURS ☐ 48 HOURS ☐ 72 HOURS ☐ 5 DAYS ☐ 10 DAYS ☐ ROUTINE ☐ OTHER

1. RELINQUISHED BY: SIGNATURE:	DATE 1/29/01	2. RELINQUISHED BY: SIGNATURE:	DATE 1-29-01	3. RELINQUISHED BY: SIGNATURE:	DATE		
PRINTED NAME/COMPANY:	TIME 1605	PRINTED NAME/COMPANY: SR	TIME 1935	PRINTED NAME/COMPANY:	TIME		
1. RECEIVED BY: SIGNATURE:	DATE 1-29-01	2. RECEIVED BY: SIGNATURE:	DATE 1/29/01	3. RECEIVED BY: SIGNATURE:	DATE		
PRINTED NAME/COMPANY: SR	TIME 1-29-01	PRINTED NAME/COMPANY: STL	TIME 17:35	PRINTED NAME/COMPANY:	TIME		

* RUSH TURNAROUND MAY REQUIRE SURCHARGE

000004

SEVERN TRENT LABORATORIES
1721 South Grand Avenue
Santa Ana, CA 92705
Phone: (714) 258-8610 / Fax: (714) 258-0921

STL Committed To Your Success

SEVERN TRENT LABORATORIES

No. 202641

CHAIN OF CUSTODY RECORD

CUSTOMER INFORMATION	PROJECT INFORMATION
COMPANY: Kennedy Jenks	PROJECT NAME/NUMBER: 004032.01
SEND REPORT TO: Jay Knight	**BILLING INFORMATION**
ADDRESS: 2151 Michelson Dr. Ste 100	BILL TO:
Irvine, Ca 92612	ADDRESS:
PHONE: 949-261-1577	PHONE:
FAX:	FAX: PO NO.:

NUMBER OF CONTAINERS

ANALYSIS / METHOD REQUEST: 8260 VOA

LAB JOB NO.

SAMPLE NO.	SAMPLE DESCRIPTION	SAMPLE DATE	SAMPLE TIME	SAMPLE MATRIX	CONTAINER	PRESERV.	NUMBER OF CONTAINERS	ANALYSIS / METHOD REQUEST: 8260 VOA	REMARKS/PRECAUTIONS
	D-1-45	1/29/01	15:30	Soil	SS	ICE	1	X	
	D-1-55		15:35	Soil	SS	ICE	1	X	
	TRIP BLANK		16:00	W	VOA	HCL	1	X	
	RINSATE	1/29/01	16:00	W	VOA	HCL	1	X	

SAMPLER: Tim

SHIPMENT METHOD:

AIRBILL NO.:

REQUIRED TURNAROUND* ☐ SAME DAY ☐ 24 HOURS ☐ 48 HOURS ☐ 72 HOURS ☐ 5 DAYS ☐ 10 DAYS ☐ ROUTINE ☐ OTHER

1. RELINQUISHED BY: SIGNATURE: Tim Doyle	DATE 1/29/01	2. RELINQUISHED BY: SIGNATURE:	DATE 1-29-01	3. RELINQUISHED BY: SIGNATURE:	DATE
PRINTED NAME/COMPANY: Tim Doyle KJ	TIME 1605	PRINTED NAME/COMPANY: SR	TIME 1735	PRINTED NAME/COMPANY:	TIME
1. RECEIVED BY: SIGNATURE:	DATE 1/29/01	2. RECEIVED BY: SIGNATURE: Pacific	DATE 1/29/01	3. RECEIVED BY: SIGNATURE:	DATE
PRINTED NAME/COMPANY: STL	TIME 1635	PRINTED NAME/COMPANY: STL	TIME 1735	PRINTED NAME/COMPANY:	TIME

* RUSH TURNAROUND MAY REQUIRE SURCHARGE

0000044

SEVERN TRENT LABORATORIES
1721 South Grand Avenue
Santa Ana, CA 92705
Phone: (714) 258-8610 / Fax: (714) 258-0921

KENNEDY/JENKS CONSULTANTS

Client Sample ID: D-I-35

GC/MS Volatiles

Lot-Sample #...: E1A290176-027 Work Order #...: DVADW1AA Matrix.....: SOLID
Date Sampled...: 01/29/01 15:25 Date Received..: 01/29/01 17:35 MS Run #.....: 1032224
Prep Date.....: 01/31/01 Analysis Date..: 01/31/01
Prep Batch #...: 1032443 Analysis Time..: 19:33
Dilution Factor: 1
Analyst ID.....: 999998 Instrument ID..: MSD
Method.....: SW846 8260B

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
Dichlorodifluoromethane	ND	10	ug/kg	1.0
Chloromethane	ND	10	ug/kg	3.0
Vinyl chloride	ND	10	ug/kg	2.0
Bromomethane	ND	10	ug/kg	2.0
Chloroethane	ND	10	ug/kg	2.0
Trichlorofluoromethane	ND	10	ug/kg	2.0
Acrolein	ND	100	ug/kg	30
1,1-Dichloroethene	ND	5.0	ug/kg	2.0
Iodomethane	ND	10	ug/kg	5.0
Acetone	ND	25	ug/kg	15
Carbon disulfide	ND	5.0	ug/kg	2.0
Methylene chloride	**6.5**	**5.0**	**ug/kg**	**3.0**
trans-1,2-Dichloroethene	ND	5.0	ug/kg	2.0
Acrylonitrile	ND	50	ug/kg	30
Methyl tert-butyl ether	ND	5.0	ug/kg	1.0
1,1-Dichloroethane	ND	5.0	ug/kg	1.0
Vinyl acetate	ND	10	ug/kg	5.0
2,2-Dichloropropane	ND	5.0	ug/kg	2.0
cis-1,2-Dichloroethene	ND	5.0	ug/kg	2.0
2-Butanone	ND	25	ug/kg	15
Bromochloromethane	ND	5.0	ug/kg	1.0
Chloroform	**3.9 J**	**5.0**	**ug/kg**	**1.0**
Tetrahydrofuran	ND	20	ug/kg	10
1,1,1-Trichloroethane	ND	5.0	ug/kg	1.0
1,1-Dichloropropene	ND	5.0	ug/kg	1.0
Carbon tetrachloride	ND	5.0	ug/kg	1.0
Benzene	ND	5.0	ug/kg	2.0
1,2-Dichloroethane	ND	5.0	ug/kg	1.0
Trichloroethene	ND	5.0	ug/kg	2.0
1,2-Dichloropropane	ND	5.0	ug/kg	1.0
Bromodichloromethane	ND	5.0	ug/kg	1.0
2-Chloroethyl vinyl ether	ND	10	ug/kg	5.0
cis-1,3-Dichloropropene	ND	5.0	ug/kg	1.0
4-Methyl-2-pentanone	ND	25	ug/kg	10
Toluene	ND	5.0	ug/kg	2.0
trans-1,3-Dichloropropene	ND	5.0	ug/kg	3.0
1,1,2-Trichloroethane	ND	5.0	ug/kg	3.0

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KENNEDY/JENKS CONSULTANTS

Client Sample ID: D-I-35

GC/MS Volatiles

Lot-Sample #...: E1A290176-027 Work Order #...: DVADW1AA Matrix.....: SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
Tetrachloroethene	ND	5.0	ug/kg	2.0
2-Hexanone	ND	25	ug/kg	10
Dibromochloromethane	ND	5.0	ug/kg	5.0
1,2-Dibromoethane	ND	5.0	ug/kg	3.0
Chlorobenzene	ND	5.0	ug/kg	2.0
Ethylbenzene	ND	5.0	ug/kg	2.0
Xylenes (total)	ND	5.0	ug/kg	3.0
Styrene	ND	10	ug/kg	2.0
Bromoform	ND	5.0	ug/kg	3.0
Isopropylbenzene	ND	5.0	ug/kg	2.0
p-Isopropyltoluene	ND	5.0	ug/kg	2.0
Bromobenzene	ND	5.0	ug/kg	2.0
1,1,1,2-Tetrachloroethane	ND	5.0	ug/kg	3.0
1,1,2,2-Tetrachloroethane	ND	5.0	ug/kg	3.0
1,2,3-Trichloropropane	ND	5.0	ug/kg	3.0
n-Propylbenzene	ND	5.0	ug/kg	2.0
2-Chlorotoluene	ND	5.0	ug/kg	2.0
4-Chlorotoluene	ND	5.0	ug/kg	2.0
1,3,5-Trimethylbenzene	ND	5.0	ug/kg	2.0
tert-Butylbenzene	ND	5.0	ug/kg	2.0
1,2,4-Trimethylbenzene	ND	5.0	ug/kg	2.0
sec-Butylbenzene	ND	5.0	ug/kg	2.0
1,3-Dichlorobenzene	ND	5.0	ug/kg	2.0
1,4-Dichlorobenzene	ND	5.0	ug/kg	2.0
1,2-Dichlorobenzene	ND	5.0	ug/kg	2.0
n-Butylbenzene	ND	5.0	ug/kg	2.0
1,2-Dibromo-3-chloro-propane	ND	10	ug/kg	3.0
1,2,4-Trichloro-benzene	ND	5.0	ug/kg	2.0
Hexachlorobutadiene	ND	5.0	ug/kg	2.0
1,2,3-Trichlorobenzene	ND	5.0	ug/kg	2.0

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Bromofluorobenzene	91	(70 - 130)
1,2-Dichloroethane-d4	110	(60 - 140)
Toluene-d8	87	(70 - 130)

NOTE(S):

J Estimated result Result is less than RL.

KENNEDY/JENKS CONSULTANTS

Client Sample ID: D-I-45

GC/MS Volatiles

Lot-Sample #...:	E1A290176-028	**Work Order #...:**	DVADX1AA	**Matrix.....:**	SOLID
Date Sampled...:	01/29/01 15:30	**Date Received..:**	01/29/01 17:35	**MS Run #.....:**	1033085
Prep Date.....:	02/01/01	**Analysis Date..:**	02/01/01		
Prep Batch #...:	1033222	**Analysis Time..:**	11:11		
Dilution Factor:	1				
Analyst ID.....:	999998	**Instrument ID..:**	MSD		
		Method.....:	SW846 8260B		

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
Dichlorodifluoromethane	ND	10	ug/kg	1.0
Chloromethane	ND	10	ug/kg	3.0
Vinyl chloride	ND	10	ug/kg	2.0
Bromomethane	ND	10	ug/kg	2.0
Chloroethane	ND	10	ug/kg	2.0
Trichlorofluoromethane	ND	10	ug/kg	2.0
Acrolein	ND	100	ug/kg	30
1,1-Dichloroethene	ND	5.0	ug/kg	2.0
Iodomethane	ND	10	ug/kg	5.0
Acetone	ND	25	ug/kg	15
Carbon disulfide	ND	5.0	ug/kg	2.0
Methylene chloride	**5.8**	**5.0**	**ug/kg**	**3.0**
trans-1,2-Dichloroethene	ND	5.0	ug/kg	2.0
Acrylonitrile	ND	50	ug/kg	30
Methyl tert-butyl ether	ND	5.0	ug/kg	1.0
1,1-Dichloroethane	ND	5.0	ug/kg	1.0
Vinyl acetate	ND	10	ug/kg	5.0
2,2-Dichloropropane	ND	5.0	ug/kg	2.0
cis-1,2-Dichloroethene	ND	5.0	ug/kg	2.0
2-Butanone	ND	25	ug/kg	15
Bromochloromethane	ND	5.0	ug/kg	1.0
Chloroform	**16**	**5.0**	**ug/kg**	**1.0**
Tetrahydrofuran	ND	20	ug/kg	10
1,1,1-Trichloroethane	ND	5.0	ug/kg	1.0
1,1-Dichloropropene	ND	5.0	ug/kg	1.0
Carbon tetrachloride	ND	5.0	ug/kg	1.0
Benzene	ND	5.0	ug/kg	2.0
1,2-Dichloroethane	ND	5.0	ug/kg	1.0
Trichloroethene	ND	5.0	ug/kg	2.0
1,2-Dichloropropane	ND	5.0	ug/kg	1.0
Bromodichloromethane	ND	5.0	ug/kg	1.0
2-Chloroethyl vinyl ether	ND	10	ug/kg	5.0
cis-1,3-Dichloropropene	ND	5.0	ug/kg	1.0
4-Methyl-2-pentanone	ND	25	ug/kg	10
Toluene	ND	5.0	ug/kg	2.0
trans-1,3-Dichloropropene	ND	5.0	ug/kg	3.0
1,1,2-Trichloroethane	ND	5.0	ug/kg	3.0

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KENNEDY/JENKS CONSULTANTS

Client Sample ID: D-I-45

GC/MS Volatiles

Lot-Sample #...: E1A290176-028 Work Order #...: DVADX1AA Matrix.....: SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
Tetrachloroethene	ND	5.0	ug/kg	2.0
2-Hexanone	ND	25	ug/kg	10
Dibromochloromethane	ND	5.0	ug/kg	5.0
1,2-Dibromoethane	ND	5.0	ug/kg	3.0
Chlorobenzene	ND	5.0	ug/kg	2.0
Ethylbenzene	ND	5.0	ug/kg	2.0
Xylenes (total)	ND	5.0	ug/kg	3.0
Styrene	ND	10	ug/kg	2.0
Bromoform	ND	5.0	ug/kg	3.0
Isopropylbenzene	ND	5.0	ug/kg	2.0
p-Isopropyltoluene	ND	5.0	ug/kg	2.0
Bromobenzene	ND	5.0	ug/kg	2.0
1,1,1,2-Tetrachloroethane	ND	5.0	ug/kg	3.0
1,1,2,2-Tetrachloroethane	ND	5.0	ug/kg	3.0
1,2,3-Trichloropropane	ND	5.0	ug/kg	3.0
n-Propylbenzene	ND	5.0	ug/kg	2.0
2-Chlorotoluene	ND	5.0	ug/kg	2.0
4-Chlorotoluene	ND	5.0	ug/kg	2.0
1,3,5-Trimethylbenzene	ND	5.0	ug/kg	2.0
tert-Butylbenzene	ND	5.0	ug/kg	2.0
1,2,4-Trimethylbenzene	ND	5.0	ug/kg	2.0
sec-Butylbenzene	ND	5.0	ug/kg	2.0
1,3-Dichlorobenzene	ND	5.0	ug/kg	2.0
1,4-Dichlorobenzene	ND	5.0	ug/kg	2.0
1,2-Dichlorobenzene	ND	5.0	ug/kg	2.0
n-Butylbenzene	ND	5.0	ug/kg	2.0
1,2-Dibromo-3-chloro-propane	ND	10	ug/kg	3.0
1,2,4-Trichloro-benzene	ND	5.0	ug/kg	2.0
Hexachlorobutadiene	ND	5.0	ug/kg	2.0
1,2,3-Trichlorobenzene	ND	5.0	ug/kg	2.0

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Bromofluorobenzene	94	(70 - 130)
1,2-Dichloroethane-d4	103	(60 - 140)
Toluene-d8	89	(70 - 130)

KENNEDY/JENKS CONSULTANTS

Client Sample ID: D-I-55

GC/MS Volatiles

Lot-Sample #...:	E1A290176-029	**Work Order #...:**	DVAD01AA	**Matrix.....:**	SOLID
Date Sampled...:	01/29/01 15:35	**Date Received..:**	01/29/01 17:35	**MS Run #.....:**	1033085
Prep Date.....:	02/01/01	**Analysis Date..:**	02/01/01		
Prep Batch #...:	1033222	**Analysis Time..:**	11:42		
Dilution Factor:	1				
Analyst ID.....:	999998	**Instrument ID..:**	MSD		
		Method.....:	SW846 8260B		

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
Dichlorodifluoromethane	ND	10	ug/kg	1.0
Chloromethane	ND	10	ug/kg	3.0
Vinyl chloride	ND	10	ug/kg	2.0
Bromomethane	ND	10	ug/kg	2.0
Chloroethane	ND	10	ug/kg	2.0
Trichlorofluoromethane	ND	10	ug/kg	2.0
Acrolein	ND	100	ug/kg	30
1,1-Dichloroethene	ND	5.0	ug/kg	2.0
Iodomethane	ND	10	ug/kg	5.0
Acetone	ND	25	ug/kg	15
Carbon disulfide	ND	5.0	ug/kg	2.0
Methylene chloride	**5.0**	**5.0**	**ug/kg**	**3.0**
trans-1,2-Dichloroethene	ND	5.0	ug/kg	2.0
Acrylonitrile	ND	50	ug/kg	30
Methyl tert-butyl ether	ND	5.0	ug/kg	1.0
1,1-Dichloroethane	ND	5.0	ug/kg	1.0
Vinyl acetate	ND	10	ug/kg	5.0
2,2-Dichloropropane	ND	5.0	ug/kg	2.0
cis-1,2-Dichloroethene	ND	5.0	ug/kg	2.0
2-Butanone	ND	25	ug/kg	15
Bromochloromethane	ND	5.0	ug/kg	1.0
Chloroform	**12**	**5.0**	**ug/kg**	**1.0**
Tetrahydrofuran	ND	20	ug/kg	10
1,1,1-Trichloroethane	ND	5.0	ug/kg	1.0
1,1-Dichloropropene	ND	5.0	ug/kg	1.0
Carbon tetrachloride	ND	5.0	ug/kg	1.0
Benzene	ND	5.0	ug/kg	2.0
1,2-Dichloroethane	ND	5.0	ug/kg	1.0
Trichloroethene	ND	5.0	ug/kg	2.0
1,2-Dichloropropane	ND	5.0	ug/kg	1.0
Bromodichloromethane	ND	5.0	ug/kg	1.0
2-Chloroethyl vinyl ether	ND	10	ug/kg	5.0
cis-1,3-Dichloropropene	ND	5.0	ug/kg	1.0
4-Methyl-2-pentanone	ND	25	ug/kg	10
Toluene	ND	5.0	ug/kg	2.0
trans-1,3-Dichloropropene	ND	5.0	ug/kg	3.0
1,1,2-Trichloroethane	ND	5.0	ug/kg	3.0

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KENNEDY/JENKS CONSULTANTS

Client Sample ID: D-I-55

GC/MS Volatiles

Lot-Sample #...: E1A290176-029 Work Order #...: DVAD01AA Matrix.....: SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	MDL
Tetrachloroethene	ND	5.0	ug/kg	2.0
2-Hexanone	ND	25	ug/kg	10
Dibromochloromethane	ND	5.0	ug/kg	5.0
1,2-Dibromoethane	ND	5.0	ug/kg	3.0
Chlorobenzene	ND	5.0	ug/kg	2.0
Ethylbenzene	ND	5.0	ug/kg	2.0
Xylenes (total)	ND	5.0	ug/kg	3.0
Styrene	ND	10	ug/kg	2.0
Bromoform	ND	5.0	ug/kg	3.0
Isopropylbenzene	ND	5.0	ug/kg	2.0
p-Isopropyltoluene	ND	5.0	ug/kg	2.0
Bromobenzene	ND	5.0	ug/kg	2.0
1,1,1,2-Tetrachloroethane	ND	5.0	ug/kg	3.0
1,1,2,2-Tetrachloroethane	ND	5.0	ug/kg	3.0
1,2,3-Trichloropropane	ND	5.0	ug/kg	3.0
n-Propylbenzene	ND	5.0	ug/kg	2.0
2-Chlorotoluene	ND	5.0	ug/kg	2.0
4-Chlorotoluene	ND	5.0	ug/kg	2.0
1,3,5-Trimethylbenzene	ND	5.0	ug/kg	2.0
tert-Butylbenzene	ND	5.0	ug/kg	2.0
1,2,4-Trimethylbenzene	ND	5.0	ug/kg	2.0
sec-Butylbenzene	ND	5.0	ug/kg	2.0
1,3-Dichlorobenzene	ND	5.0	ug/kg	2.0
1,4-Dichlorobenzene	ND	5.0	ug/kg	2.0
1,2-Dichlorobenzene	ND	5.0	ug/kg	2.0
n-Butylbenzene	ND	5.0	ug/kg	2.0
1,2-Dibromo-3-chloro-propane	ND	10	ug/kg	3.0
1,2,4-Trichloro-benzene	ND	5.0	ug/kg	2.0
Hexachlorobutadiene	ND	5.0	ug/kg	2.0
1,2,3-Trichlorobenzene	ND	5.0	ug/kg	2.0

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Bromofluorobenzene	94	(70 - 130)
1,2-Dichloroethane-d4	106	(60 - 140)
Toluene-d8	89	(70 - 130)

Appendix E
Boring D-1 Boring Log

Boring Log

Kennedy/Jenks Consultants

BORING LOCATION: Feature Number: Parcel D	Boring Name: D-1
DRILLING COMPANY: West Hazmat / DRILLER: Steve	Project Name: Boeing C-6, Parcel C
DRILLING METHOD (S): Hollow Stem Auger / DRILL BIT (S) SIZE (in.): 6	Project Number: 004032.01
DEPTH TO WATER (ft.): Not Encountered	ELEVATION (ft. MSL): - / TOTAL DEPTH (ft.): 55
LOGGED BY: TD	DATE STARTED: 11-29-01 / DATE COMPLETED: 11-29-01

SAMPLES: Driven	SAMPLES: Recovered	SAMPLES: Collected	SAMPLES: Blows per 6"	SAMPLES: Head Space Reading (ppm)	Depth (feet)	Graphic Log	USCS Log	Munsell Color	SOIL DESCRIPTION AND DRILLING REMARKS
									0-35' logged from cuttings
					5		ML	10YR 4/4	Sandy SILT to Clayey SILT: dark yellowish brown, damp, stiff
					10				
					15				
					20				
					25				
					30				
		▨			35		SM	2.5Y 5/6	Silty SAND: light olive brown, very fine to fine sand, damp, medium dense, trace amounts of iron oxide staining (orange)
					40				

K:\Boeing\C-6 Boring Logs\D-1a.dwg, 8/2/2001

Boring Log

Kennedy/Jenks Consultants

Boring Name: D-1
Project Name: Boeing C-6, Parcel C
Project Number: 004032.01

SAMPLES: Driven	SAMPLES: Recovered	SAMPLES: Collected	SAMPLES: Blows per 6"	SAMPLES: Head Space Reading (ppm)	Depth (feet)	Graphic Log	USCS Log	Munsell Color	
					40		SM		Silty SAND: continued
					45		SP	2.5Y 5/6	SAND: light olive brown, very fine, dense, some iron staining (orange)
					50		SP	2.5Y 5/6	SAND: light olive brown, very fine to medium sand, damp, dense, some iron staining
					55				Total Depth = 55'
					60				
					65				
					70				
					75				
					80				
					85				

K:\Boeing\C-6 Boring Logs\D-1aa.dwg, 8/2/2001

Appendix F
Risk Assessment Discussion and Calculations

Risk Assessment Discussion and Calculations

To evaluate the human health risks associated with the various deep soil residual impacts, post demolition risk assessment calculations were performed to supplement the initial post-demolition risk assessment (Integrated 2000). The following additional potential exposure pathways were evaluated for risk assessment calculations after incorporating the January 2001 investigation results:

- inhalation of VOCs in indoor air from upward VOC vapor migration from deep soil into onsite buildings

- inhalation of VOCs in indoor air from upward VOC vapor migration from groundwater into onsite buildings

- inhalation of VOCs in indoor air due to VOC migration from deep soil leachate migration to groundwater and subsequent VOC vapor migration from groundwater into indoor air

Potential further degradation of groundwater due to VOC leaching from soil to groundwater was also evaluated.

The results of the additional risk assessment and the groundwater protection assessment activities are presented below.

Inhalation of Indoor Air – VOC Vapor Migration from Soil into Indoor Air (Including Soil Impacts Deeper Than 25 feet bgs)

The highest previously estimated excess lifetime cancer risk and hazard index associated with potential exposure by the onsite commercial/industrial worker to chloroform from vapor migration into indoor air, as presented in the post-demolition risk assessment, is 4.25×10^{-10} and 0.0000069, respectively. These values are based on an estimated 95 percent upper confidence limit (95% UCL) concentration of chloroform. Since the chloroform concentrations detected during the January 2001 investigation activities are less than the highest concentration reported during the June/July 1999 investigation activities, an estimated 95% UCL concentration for chloroform after incorporating the January 2001 data would be less than the previously estimated 95% UCL concentration. Thus, the associated estimated excess lifetime cancer risk and hazard index after incorporating the January 2001 investigation results would be less than the previously estimated values.

An estimated excess lifetime cancer risk was calculated for possible methylene chloride vapor migration into indoor air for the onsite commercial/industrial worker using the County of San Diego Department of Environmental Health (DEH) vapor migration model and input parameter values presented in the post-demolition risk assessment. The DEH model has been approved by the RWQCB and the OEHHA for use during the proposed Parcel C risk assessments. The model results, presented in Appendix G, indicate that the estimated excess lifetime cancer risk and hazard index for possible methylene chloride vapor migration into indoor air is 3.0×10^{-10} and 0.0000022, respectively. Adding the previously estimated risk for VOC migration into

indoor air to the estimated risk for methylene chloride results in a risk of 7.7×10^{-10}. This risk estimate is approximately 13,000 times less of the OEHHA-approved acceptable risk level of 1×10^{-5}.

INHALATION OF INDOOR AIR – VOC VAPOR MIGRATION FROM GROUNDWATER INTO INDOOR AIR

As previously indicated no source of chlorinated VOCs originating from the subject parcel has been identified. Assuming that the VOC source in soil is attributed to VOC migration from groundwater, it is assumed that the estimated risk associated with upward VOC migration from groundwater provides an estimate of the risk associated with upward VOC migration from impacted soil.

Excess lifetime cancer risk and hazard index associated with the vapor migration pathway for the onsite commercial/industrial worker were estimated using the DEH vapor migration model and the highest chloroform, PCE, and methylene chloride concentrations in groundwater obtained from either the most recent samples collected from groundwater monitoring well XMW-09, situated on the subject parcel, or downgradient monitoring wells TMW-11 through TMW-14. The model results are presented in Appendix G, and a summary of the results is presented in Table F-1.

As shown in Table F-1, both the estimated excess cancer risk and estimated hazard index are orders of magnitude less than the risk thresholds of 1.0×10^{-5} and 1.0, respectively. Thus, the existing chloroform and PCE concentrations in groundwater beneath the southern portion of the subject parcel do not pose an indoor air health risk greater than acceptable risk levels.

Groundwater Quality Impact Assessment

The objective of the groundwater protection assessment is to evaluate whether existing chemical concentrations in onsite soils have the potential to degrade existing groundwater quality. Even though shallow groundwater beneath and in proximity to subject parcel is not used as a domestic water supply, the RWQCB requested, as a conservative measure, that an evaluation be conducted of potential downward chemical migration from soil resulting in possible degradation of the Bellflower aquitard, the most shallow water-bearing zone. The estimated chemical concentrations in groundwater were compared to California drinking water standards, specifically MCLs. This evaluation conservatively and unrealistically assumes that the Bellflower aquitard is a part of the underlying aquifers providing domestic water supply. As described below, the assessment was conducted assuming a conservative scenario regarding chemical migration and mixing in groundwater following approved EPA and RWQCB methodology and assumptions.

The maximum compound of potential concern (COPC) concentrations in soil were compared to site-specific soil screening levels (SSLs) derived from primary or secondary MCLs. Initial site-specific SSLs were derived using the following formula presented in Section 2.5 of the EPA document entitled *Soil Screening Guidance: Technical Background Document (TBD),* dated July 1996:

$$\text{Initial SSL} = \text{MCL}\ [(K_{oc} * f_{oc}) + ((O_w + O_a * H')/P_b)] \qquad \text{(Equation 1)}$$

Where:

Initial SSL = soil screening level, mg/kg;
MCL = maximum contaminant level, mg/L;
K_{oc} = soil organic carbon-water partition coefficient, L/kg;
f_{oc} = organic carbon content of soil, kg/kg;
O_w = water-filled soil porosity, L_{water}/L_{soil};
O_a = air-filled soil porosity, L_{air}/L_{soil};
H' = Henry's law constant, dimensionless; and
P_b = dry soil bulk density, kg/L.

Site-specific geotechnical parameters are presented in Table F-2. The above equation is a partitioning formula, which does not account for chemical attenuation during migration in soil or mixing with groundwater. To better represent contaminant migration in the soil column, an attenuation factor of 3 was applied to the initial SSLs for chloroform, PCE, and methylene chloride. This attenuation factor was obtained from T5-14: Average Attenuation Factor for Different Distance above Ground Water and Lithology presented in the LARWQCB's May 1996 *Interim Site Assessment & Cleanup Guidebook* (the Guidebook), assuming site-specific average soil particle size distributions of 34 percent sand, 54 percent silt, and 13 percent clay (Table F-3), and a distance of 40 feet from soil impacts to the groundwater table. This distance is considered to be appropriate because the depth to groundwater at the site is approximately 65 feet bgs, and the maximum COPC concentrations were detected at approximately 25 feet bgs.

An EPA default dilution attenuation factor (DAF) of 20 was applied to the initial SSL to account for limited groundwater mixing. This EPA default value is presented in the above-referenced July 1996 EPA document, and was used by EPA to develop generic SSLs. The resulting site-specific SSL is equal to the initial SSL (assuming no soil attenuation or groundwater mixing) multiplied by the product of a soil attenuation factor (e.g. 3) and a groundwater mixing factor of 20.

The calculation of site-specific SSLs for COPCs that have promulgated MCLs is presented in Table F-4. A comparison of the calculated site-specific SSLs with the maximum COPC concentrations in soil is also presented in Table F-4.

The maximum chemical concentrations in onsite soil do not exceed the site-specific groundwater protection concentrations (i.e., site-specific SSLs). Thus, chemical concentrations in vadose soils beneath the subject parcel do not to pose a threat to groundwater quality via leaching from soil to groundwater.

INHALATION OF INDOOR AIR – VOC MIGRATION FROM SOIL LEACHATE MIGRATION TO GROUNDWATER AND SUBSEQUENT VOC VAPOR MIGRATION FROM GROUNDWATER INTO INDOOR AIR

VOCs in soil may leach into groundwater and subsequently volatilize from groundwater and, through upward diffusion, migrate through the soil column into indoor air. A simple

comparison between estimated maximum VOC concentrations in groundwater, due to chemical leaching to groundwater, and measured VOC concentrations in groundwater was conducted to assess whether the existing VOC concentrations in soil may further degrade existing groundwater quality.

The SSL equation (Equation 1) was used to estimate maximum VOC concentrations in pore water by substituting the SSL parameter with maximum onsite soil concentrations in the equation to derive the maximum pore water concentration instead of the MCL:

$$C_{pw} = C_s / [(K_{oc} * f_{oc}) + ((O_w + O_a*H')/P_b)] \qquad \text{(Equation 2)}$$

Where:

C_{pw} = maximum VOC concentration in pore water, mg/L; and
C_s = maximum VOC concentration in soil, mg/kg.

The estimated maximum VOC concentration in groundwater was then derived by applying the soil attenuation factor of 3 and the EPA DAF of 20 to the maximum pore water concentration. The resulting estimated maximum VOC concentrations in groundwater are presented in Table F-5. In Table F-6, these concentrations are compared to the measured VOC concentrations in groundwater from the closest groundwater monitoring well(s) on or in proximity to the subject parcel.

As shown in Table F-6, the estimated maximum groundwater concentrations for chloroform, PCE, and methylene chloride are all less than the most recently measured concentrations for groundwater samples collected from the monitoring well situated closest to the borings with the greatest onsite soil concentrations of these chemicals. Since, the VOC concentrations from these measured groundwater samples do not pose health risks greater than acceptable levels (see Table F-1), the estimated maximum groundwater concentrations would also not pose health risks greater than acceptable levels from inhalation of indoor air due to vapor migration from groundwater into indoor air.

CUMULATIVE HUMAN HEALTH RISKS

As indicated in the previous sections, the following additional potential exposure pathways were evaluated after incorporating the January 2001 investigation results:

- inhalation of VOCs in indoor air from upward VOC vapor migration from deep soil into onsite buildings

- inhalation of VOCs in indoor air from upward VOC vapor migration from groundwater into onsite buildings

- inhalation of VOCs in indoor air due to VOC migration from deep soil leachate migration to groundwater and subsequent VOC vapor migration from groundwater into indoor air

The risks associated with the above-listed exposure pathways, and the estimated risks to potential onsite receptors as presented in the post-demolition risk assessment are summarized in Table F-7. As shown in Table F-7, adding the estimated risks from the above-listed pathways to the estimated risks to the potential on-site receptors do not result in risks greater than the OEHHA-approved acceptable risk levels.

Table F-1

Summary of Risk Associated with VOC Vapor Migration from Groundwater

Chemical	Closest Groundwater Monitoring Well	Most Recent Date Sampled	Groundwater Monitoring Well Concentration (mg/L)	Excess Cancer Risk	Estimated Hazard Index
Chloroform	XMW-09	October 12, 2000	1.500*	3.8×10^{-8}	0.000061
PCE	XMW-09	October 12, 2000	0.055*	5.2×10^{-9}	0.000070
Methylene chloride	TMW-12	January 25, 2001	0.004**	1.1×10^{-11}	0.000000077
Total				4.3×10^{-8}	0.00013

* Data obtained from K/J from groundwater sample collected on October 12, 2000 (laboratory report presented in Appendix B).

** Methylene chloride results for groundwater sample collected from XMW-09 on October 12, 2000 was <0.005 mg/L. Groundwater monitoring wells located downgradient of XMW-09 include TMW-11 through TMW-14 and TMW-18. During the most recent groundwater sampling event (January 25, 2001), TWM-14 exhibited a methylene chloride concentration of 0.004 mg/L (laboratory report presented in Appendix C).

Table F-2. Site-specific Geotechnical Parameters at the BRC Former C-6 Facility

Sample ID	Date Sampled	Depth (feet bgs)	Sieve Analysis (Soil Type)	Dry Bulk Density (kg/L)	Moisture Content (percent by weight)	Total Porosity (fraction by volume)	Air-filled Porosity (fraction by volume)	Water-filled Porosity (fraction by volume)	TOC* (mg/kg)	f_{oc} (fraction by weight)
EIA290176-001 (I-34-5)	1/29/2001	5	Silt	1.51	15.9	0.43	0.19	0.24	520	0.0005
EIA290176-010 (D-29-5)	1/29/2001	5	Silt	1.44	20.3	0.46	0.16	0.29	2350	0.0024
EIA29176-018 (I-25-5)	1/29/2001	5	Silt	1.34	17.8	0.49	0.26	0.24	690	0.0007
Average				**1.43**	**18.0**	**0.46**	**0.20**	**0.26**	**1187**	**0.0012**
EIA290176-004 (I-34-20)	1/29/2001	20	Silt	1.54	17.5	0.42	0.15	0.27	330	0.0003
EIA290176-012 (D-29-20)	1/29/2001	20	Silt	1.55	17.0	0.41	0.15	0.26	430	0.0004
EIA29176-021 (I-25-20)	1/29/2001	20	Silt	1.37	20.2	0.48	0.20	0.28	410	0.0004
Average				**1.49**	**18.2**	**0.44**	**0.17**	**0.27**	**390**	**0.0004**
EIA290176-007 (I-34-50)	1/29/2001	50	Fine sand	1.35	4.4	0.51	0.45	0.06	230	0.0002
EIA29176-015 (D-29-50)	1/29/2001	50	Fine sand	1.36	19.5	0.49	0.22	0.26	560	0.0006
EIA29176-024 (I-25-50)	1/29/2001	50	Silt	1.34	24.3	0.51	0.18	0.32	470	0.0005
Average				**1.35**	**16.1**	**0.50**	**0.28**	**0.22**	**420**	**0.0004**
Weighted Fraction by weight (depths 25 to 65 feet bgs)				1.44		0.46	0.21	0.25		0.0004

The weighted fraction by weight assumes the 5-foot sample is representative of the top 20 feet, the 20-foot sample of depths between 20 and 50 feet, and the 50-foot sample of depths between 50 and 65 feet bgs.

Notes:
The air-filled porosity values were calculated from gravimetric data, not volumetric data.

* f_{oc} = the weight fraction of organic carbon in soil = TOC/1,000,000

Table F-3. Soil Particle Size Distribution at BRC Former C-6 Facility

Sample ID	Date Sampled	Depth (feet bgs)	Sieve Analysis (Soil Type)	Median Grain Size (mm)	Particle Size Distribution, wt. Percent						
					Gravel	Sand Size				Silt	Clay
						Coarse	Medium	Fine	TOTAL		
EIA290176-001 (I-34-5)	1/29/2001	5	Silt	0.029	0.00	0.00	0.22	17.60	17.82	69.80	12.37
EIA290176-010 (D-29-5)	1/29/2001	5	Silt	0.027	0.00	0.00	0.02	17.00	17.02	68.41	14.58
EIA29176-018 (I-25-5)	1/29/2001	5	Silt	0.026	0.00	0.00	0.39	14.86	15.25	68.78	15.97
Average									**16.70**	**69.00**	**14.31**
EIA290176-004 (I-34-20)	1/29/2001	20	Silt	0.032	0.00	0.00	0.00	31.19	31.19	54.83	13.99
EIA290176-012 (D-29-20)	1/29/2001	20	Silt	0.036	0.00	0.00	0.90	27.59	28.49	59.67	11.85
EIA29176-021 (I-25-20)	1/29/2001	20	Silt	0.020	0.00	0.00	0.00	11.21	11.21	69.07	19.72
Average									**23.63**	**61.19**	**15.19**
EIA290176-007 (I-34-50)	1/29/2001	50	Fine sand	0.151	0.00	0.00	0.57	79.33	79.90	17.39	2.71
EIA29176-015 (D-29-50)	1/29/2001	50	Fine sand	0.083	0.00	0.00	3.26	47.93	51.19	39.79	9.01
EIA29176-024 (I-25-50)	1/29/2001	50	Silt	0.027	0.00	0.00	0.04	21.27	21.31	64.99	13.70
Average									**50.80**	**40.72**	**8.47**

Weighted Fraction by weight (depths 25 to 65 feet bgs)	0.34	0.54	0.13

The weighted fraction by weight assumes the 5-foot sample is representative of the top 20 feet, the 20-foot sample of depths between 20 and 50 feet, and the 50-foot sample of depths between 50 and 65 feet bgs.

Table F-4. Comparison of Maximum Soil Concentrations to Site-specific SSLs Calculated at 25 Feet Below Ground Surface

CAS No.	Chemical	MCL (mg/L)	K_{oc} [1,2]	f_{oc} [3]	K_d [4]	H' [1]	O_w [3]	O_a [3]	P_b [3]	Max. Residual Soil Concentration (mg/kg)	AF at D=40'	Site-specific SSL (mg/kg) at AF = 1	Site-specific SSL (mg/kg) at AF at D=40'	Site-specific SSL (mg/kg) at AF at D=40' and DAF=20	Max > SSL for at AF_T at D=40' and DAF=20?
67-66-3	Chloroform	na	--	--	--	--	--	--	--	3.30E-01					
75-09-2	Methylene Chloride	5.00E-03	1.0E+01	4.01E-04	--	9.0E-02	2.50E-01	2.12E-01	1.44E+00	6.80E-03	3	9.57E-04	2.70E-03	5.39E-02	**No**
127-18-4	Tetrachloroethene	5.00E-03	2.7E+02	4.01E-04	--	7.5E-01	2.50E-01	2.12E-01	1.44E+00	4.70E-02	3	1.97E-03	5.54E-03	1.11E-01	**No**

An SSL was not derived for chemicals that do not have promulgated primary MCLs. These chemicals were not included in the assessment of potential further degradation to groundwater quality.

AF = Average attenuation factor based on site lithology (distance to groundwater = 40 feet, 34% sand, 53% silt, and 13% clay).

na = not available
K_{oc} = soil organic carbon-water partition coefficient (L/kg)
f_{oc} = site-specific organic carbon content of soil (kg/kg)
K_d = soil-water partition coefficient (L/kg), $K_{oc} \times f_{oc}$
H' = dimensionless Henry's law constant
O_w = site-specific average water-filled porosity (by volume)
O_a = site-specific average air-filled porosity (by volume)
P_b = dry soil bulk density (kg/L)

[1] Obtained from EPA Region 9 preliminary remediation goal (PRG) physical-chemical data for volatile organic compounds, November 2000
[2] Obtained from Risk Assessment Information System (RAIS) Toxicity & Chemical-Specific Factors Data Base, January 2001, http://risk.lsd.ornl.gov/cgi-bin/tox/TOX_select?select=csf
[3] Site-specific average values
[4] Obtained from EPA Soil Screening Guidance: Technical Background Document (TBD), EPA/540/R-95/128, July 1996, http://www.epa.gov/oerrpage/superfund/resources/soil/toc.htm

Table F-5. Derivation of Estimated Maximum VOC Concentrations in Groundwater at Parcel D Using a Site-specific SSL Equation

CAS No.	Chemical	Max. Residual Soil Concentration (mg/kg)	95%UCL Residual Soil Concentration (mg/kg)	K_{oc} [1]	f_{oc} [2]	K_d [3]	H' [1]	O_w [2]	O_a [2]	P_b [2]	Pore Water Conc. (mg/L)	Groundwater Conc. (mg/L) = Pore Water Conc. / AF / DAF
67-66-3	Chloroform	3.30E-01	4.31E-02	5.3E+01	4.01E-04	--	1.5E-01	2.50E-01	2.12E-01	1.44E+00	1.5E+00	2.5E-02
127-18-4	Tetrachloroethene	4.70E-02	8.60E-03	2.7E+02	4.01E-04	--	7.5E-01	2.50E-01	2.12E-01	1.44E+00	1.2E-01	2.0E-03
75-09-2	Methylene chloride	6.80E-03	--	1.0E+01	4.01E-04	--	9.0E-02	2.50E-01	2.12E-01	1.44E+00	3.6E-02	5.9E-04

K_{oc} = soil organic carbon-water partition coefficient (L/kg)

f_{oc} = organic carbon content of soil (kg/kg)

K_d = soil-water partition coefficient (L/kg), K_{oc} x f_{oc}

H' = dimensionless Henry's law constant

O_w = site-specific average water-filled porosity (by volume)

O_a = site-specific average air-filled porosity (by volume)

P_b = dry soil bulk density (kg/L)

[1] Obtained from EPA Region 9 preliminary remediation goal (PRG) physical-chemical data for volatile organic compounds, November 2000

[2] Site-specific average values

[3] Obtained from EPA Soil Screening Guidance: Technical Background Document (TBD), EPA/540/R-95/128, dated July 1996, http://www.epa.gov/oerrpage/superfund/resources/soil/toc.htm

Table F-6
Comparison of Estimated VOC Concentrations in Groundwater to Measured VOC Concentrations in Groundwater

Chemical	Maximum Soil Concentration (mg/kg)	Estimated Maximum Potential Groundwater Concentration (mg/L)	Closest Groundwater Monitoring Well	Most Recent Date Sampled	Closest Groundwater Monitoring Well Concentration (mg/L)*
Chloroform	0.330	0.025	XMW-09	October 12, 2000	1.500**
PCE	0.047	0.0020	XMW-09	October 12, 2000	0.055
Methylene chloride	0.0068	0.00059	XMW-09	October 12, 2000	< 0.005**

* Data obtained from K/J from groundwater sample collected on October 12, 2000 (laboratory report presented in Appendix B).

** Groundwater monitoring wells located downgradient of XMW-09 include TMW-11 through TMW-14 and TMW-18. During the most recent groundwater sampling event (January 25, 2001), TMW-12 exhibited a chloroform concentration of 1.5 mg/L, and TWM-14 exhibited a methylene chloride concentration of 0.004 mg/L (laboratory report presented in Appendix C).

Table F-7. Summary of Cumulative Risks

	Onsite Construction Worker	Onsite Commercial/Industrial Worker	Onsite DTSC Commercial/Industrial Worker
Hazard Index			
Previously Estimated	0.13	0.0000069	0.011
Vapor Migration from Deep Soil	NA	0.0000022	0.0000022
Vapor Migration from Groundwater	NA	0.00013	0.00013
Vapor Migration from Deep Soil Leachate and Subsequent Volatilization from Groundwater	NA	No additional risk	No additional risk
Total	0.13	0.00014	0.011
Excess Cancer Risk			
Previously Estimated	8.5E-07	4.7E-10	1.8E-06
Vapor Migration from Deep Soil	NA	7.7E-10	7.7E-10
Vapor Migration from Groundwater	NA	4.3E-08	4.3E-08
Vapor Migration from Deep Soil Leachate and Subsequent Volatilization from Groundwater	NA	No additional risk	No additional risk
Total	8.5E-07	4.4E-08	1.8E-06

NA = Not applicable

Appendix G
Vapor Migration Model Results

SUMMARY OF VAPOR MIGRATION RESULTS - COMMERCIAL/LIGHT INDUSTRIAL SCENARIO
BRC Former C-6 Facility, Los Angeles, California

Groundwater

CAS No.	Chemical	Cancer Risk	Hazard Index	Groundwater Concentration (ug/L)
71-55-6	Chloroform	3.6E-08	6.1E-05	1.50E+03
79-01-6	Tetrachloroethylene (PCE)	5.2E-09	7.0E-05	5.50E+01
75-09-2	Methylene Chloride	1.1E-11	7.7E-08	4.00E+00

Soil

CAS No.	Chemical	Cancer Risk	Hazard Index	Soil Concentration (mg/kg)
75-09-2	Methylene Chloride	3.0E-10	2.2E-06	6.80E-03

Project Name: BRC Former Boeing C-6 Facility, Los Angeles, California

Chemical: Tetrachloroethylene (PCE)

Variable Descriptions				**Units**
CALCULATION OF SOIL GAS CONCENTRATION				
A. SOURCE - Free Product/Soil>100mg/kg.				
Mole fraction	MF	=	0.00E+00	dimensionless
Molecular weight	MW	=	1.70E+05	mg/mole
Vapor pressure	VP	=	2.43E-02	atm
Universal gas constant	R	=	8.20E-05	atm-m3/mole-K
Temperature	T	=	2.93E+02	K
Calculated soil gas concentration	**C_{sg}(fp)**	=	**0.00E+00**	**mg/m3**
B. SOURCE - Groundwater				
Water contamination level	C_w	=	5.50E+01	ug/l
Henry's Law Constant	H	=	7.50E-01	dimensionless
Calculated soil gas concentration	**C_{sg}(gw)**	=	**4.13E+01**	**mg/m3**
C. SOURCE - Soil < 100 mg/kg				
Soil contamination level	C_t	=		mg/kg
Henry's Law Constant	H	=	7.50E-01	dimensionless
Bulk density (dry)	ρ_b	=	1.50E+00	gm/cc
Air-filled porosity	θ_a	=	2.84E-01	dimensionless
Water-filled porosity	θ_w	=	1.50E-01	dimensionless
Weight fraction of organic carbon	f_{oc}	=	4.00E-03	dimensionless
Organic carbon partition coefficient	K_{oc}	=	2.70E+02	cm3/gm
Soil/water distribution coef.	K_d	=	**1.08E+00**	cm3/gm
Calculated soil gas concentration	**C_{sg}(s)**	=	**0.00E+00**	**mg/m3**
D. SOURCE - Measured Soil Gas				
Measured soil gas concentration	**C_{sg}(m)**	=		**mg/m3 (ug/l)**

E. SOIL GAS CONCENTRATION USED IN RISK CALCULATIONS >>>> 4.13E+01 mg/m3

DIFFUSIVE TRANSPORT UPWARD IN UNSATURATED ZONE				
Total porosity	θ	=	4.34E-01	dimensionless
Air-filled porosity	θ_a	=	2.84E-01	dimensionless
Diffusion coefficient in air	D_a	=	7.20E-02	cm2/sec
Effective diffusion coefficient	**D_e**	=	**5.78E-03**	cm2/sec
Depth of contamination or Csg	X	=	1.98E+01	m
Calculated Flux	**F_x**	=	**4.33E-03**	**mg/m2-hour**

CALCULATING VAPOR CONCENTRATION IN BUILDING

A. INDOOR AIR COMPONENT

Floor area of building	A	=	9.68E+02	m2
% of floor area that flux occurs			1.00E+00	dimensionless
Attenuation factor(Crack factor)	S_b	=	1.00E-02	dimensionless
Flux area within building	Af	=	**9.68E+00**	m2
Interior Height of building	R_h	=	2.44E+00	m
Volume of building	V	=	**2.36E+03**	m3
Exchange rate of air	E	=	8.30E-01	exchanges/hr
Ventilation rate	Q	=	**1.96E+03**	m3/hr
Indoor air component	**C_i**	=	**2.14E-05**	**mg/m3**

B. OUTDOOR AIR COMPONENT

Downwind contamination length	L	=		m
Wind speed	u	=		m/hr
Height of building openings (or height of breathing zone)	h	=		m
Outdoor air component	**C_o**	=	**0.00E+00**	**mg/m3**
C. TOTAL INDOOR AIR CONCENTRATION	**C_t**	=	**2.14E-05**	**mg/m3**

EXPOSURE SCENARIO

Body weight	BW	=	7.00E+01	kg
Inhalation rate	IR	=	2.00E+01	m3/day
Exposure duration	ED	=	2.50E+01	yrs
Hours per day	conversion		8.00E+00	hr/day
Exposure time	ET	=	**3.33E-01**	hr/24 hours
Days per week	conversion		2.50E+00	days/week
Weeks per year	conversion		5.00E+01	weeks/yr
Exposure frequency	EF	=	**1.25E+02**	days/yr
Averaging Time (carc. risk)	AT	=	2.56E+04	days
Averaging Time (non-carc. risk)	AT	=	**9.13E+03**	days
Chemical Intake (carc. risk)	**IT_c**	=	**2.49E-07**	**mg/kg-day**
Chemical Intake (non-carc. risk)	**IT_{nc}**	=	**6.98E-07**	**mg/kg-day**

NON-CARCINOGENIC RISK (Chronic Risk)

Chemical Intake (non-carc. risk)	**IT_{nc}**	=	6.98E-07	mg/kg-day
Reference dose	RfD	=	1.00E-02	mg/kg-day
Hazard Index	**HI**	=	**6.98E-05**	

CARCINOGENIC RISK

Chemical Intake (carc. risk)	IT_c	=	2.49E-07	mg/kg-day
Slope factor (potency)	SF	=	2.10E-02	1/(mg/kg-day)
Cancer Risk	**Risk**	=	**5.22E-09**	

Project Name: BRC Former Boeing C-6 Facility, Los Angeles, California

Chemical: Methylene Chloride

Variable Descriptions				**Units**
CALCULATION OF SOIL GAS CONCENTRATION				
A. SOURCE - Free Product/Soil>100mg/kg.				
Mole fraction	MF	=	0.00E+00	dimensionless
Molecular weight	MW	=	8.50E+04	mg/mole
Vapor pressure	VP	=	5.72E-01	atm
Universal gas constant	R	=	8.20E-05	atm-m3/mole-K
Temperature	T	=	2.93E+02	K
Calculated soil gas concentration	**C_{sg}(fp)**	=	**0.00E+00**	**mg/m3**
B. SOURCE - Groundwater				
Water contamination level	C_w	=		ug/l
Henry's Law Constant	H	=	9.00E-02	dimensionless
Calculated soil gas concentration	**C_{sg}(gw)**	=	**0.00E+00**	**mg/m3**
C. SOURCE - Soil < 100 mg/kg				
Soil contamination level	C_t	=	6.80E-03	mg/kg
Henry's Law Constant	H	=	9.00E-02	dimensionless
Bulk density (dry)	ρ_b	=	1.50E+00	gm/cc
Air-filled porosity	θ_a	=	2.84E-01	dimensionless
Water-filled porosity	θ_w	=	1.50E-01	dimensionless
Weight fraction of organic carbon	f_{oc}	=	4.00E-03	dimensionless
Organic carbon partition coefficient	K_{oc}	=	1.00E+01	cm3/gm
Soil/water distribution coef.	K_d	=	**4.00E-02**	cm3/gm
Calculated soil gas concentration	**C_{sg}(s)**	=	**3.90E+00**	**mg/m3**
D. SOURCE - Measured Soil Gas				
Measured soil gas concentration	**C_{sg}(m)**	=		**mg/m3 (ug/l)**

E. SOIL GAS CONCENTRATION USED IN RISK CALCULATIONS >>>> 3.90E+00 mg/m3

DIFFUSIVE TRANSPORT UPWARD IN UNSATURATED ZONE				
Total porosity	θ	=	4.34E-01	dimensionless
Air-filled porosity	θ_a	=	2.84E-01	dimensionless
Diffusion coefficient in air	D_a	=	1.00E-01	cm2/sec
Effective diffusion coefficient	**D_e**	=	**8.03E-03**	cm2/sec
Depth of contamination or Csg	X	=	7.62E+00	m
Calculated Flux	**F_x**	=	**1.48E-03**	**mg/m2-hour**

CALCULATING VAPOR CONCENTRATION IN BUILDING

A. INDOOR AIR COMPONENT

Floor area of building	A	=	9.68E+02	m2
% of floor area that flux occurs			1.00E+00	dimensionless
Attenuation factor(Crack factor)	S_b	=	1.00E-02	dimensionless
Flux area within building	Af	=	**9.68E+00**	m2
Interior Height of building	R_h	=	2.44E+00	m
Volume of building	V	=	**2.36E+03**	m3
Exchange rate of air	E	=	8.30E-01	exchanges/hr
Ventilation rate	Q	=	**1.96E+03**	m3/hr
Indoor air component	**C_i**	=	**7.30E-06**	**mg/m3**

B. OUTDOOR AIR COMPONENT

Downwind contamination length	L	=	0.00E+00	m
Wind speed	u	=	0.00E+00	m/hr
Height of building openings (or height of breathing zone)	h	=	0.00E+00	m
Outdoor air component	**C_o**	=	**0.00E+00**	**mg/m3**

C. TOTAL INDOOR AIR CONCENTRATION C_t = **7.30E-06** **mg/m3**

EXPOSURE SCENARIO

Body weight	BW	=	7.00E+01	kg
Inhalation rate	IR	=	2.00E+01	m3/day
Exposure duration	ED	=	2.50E+01	yrs
Hours per day	conversion		8.00E+00	hr/day
Exposure time	ET	=	**3.33E-01**	hr/24 hours
Days per week	conversion		2.50E+00	days/week
Weeks per year	conversion		5.00E+01	weeks/yr
Exposure frequency	EF	=	**1.25E+02**	days/yr
Averaging Time (carc. risk)	AT	=	2.56E+04	days
Averaging Time (non-carc. risk)	AT	=	**9.13E+03**	days
Chemical Intake (carc. risk)	**IT_c**	=	**8.48E-08**	**mg/kg-day**
Chemical Intake (non-carc. risk)	**IT_{nc}**	=	**2.38E-07**	**mg/kg-day**

NON-CARCINOGENIC RISK (Chronic Risk)

Chemical Intake (non-carc. risk)	IT_{nc}	=	2.38E-07	mg/kg-day
Reference dose	RfD	=	1.10E-01	mg/kg-day
Hazard Index	**HI**	=	**2.16E-06**	

CARCINOGENIC RISK

Chemical Intake (carc. risk)	IT_c	=	8.48E-08	mg/kg-day
Slope factor (potency)	SF	=	3.50E-03	1/(mg/kg-day)
Cancer Risk	**Risk**	=	**2.97E-10**	

Project Name: BRC Former Boeing C-6 Facility, Los Angeles, California

Chemical: Methylene Chloride

Variable Descriptions				**Units**
CALCULATION OF SOIL GAS CONCENTRATION				
A. SOURCE - Free Product/Soil>100mg/kg.				
Mole fraction	MF	=	0.00E+00	dimensionless
Molecular weight	MW	=	8.50E+04	mg/mole
Vapor pressure	VP	=	5.72E-01	atm
Universal gas constant	R	=	8.20E-05	atm-m3/mole-K
Temperature	T	=	2.93E+02	K
Calculated soil gas concentration	**C_{sg}(fp)**	=	**0.00E+00**	**mg/m3**
B. SOURCE - Groundwater				
Water contamination level	C_w	=	4.00E+00	ug/l
Henry's Law Constant	H	=	9.00E-02	dimensionless
Calculated soil gas concentration	**C_{sg}(gw)**	=	**3.60E-01**	**mg/m3**
C. SOURCE - Soil < 100 mg/kg				
Soil contamination level	C_t	=		mg/kg
Henry's Law Constant	H	=	9.00E-02	dimensionless
Bulk density (dry)	ρ_b	=	1.50E+00	gm/cc
Air-filled porosity	θ_a	=	2.84E-01	dimensionless
Water-filled porosity	θ_w	=	1.50E-01	dimensionless
Weight fraction of organic carbon	f_{oc}	=	4.00E-03	dimensionless
Organic carbon partition coefficient	K_{oc}	=	1.00E+01	cm3/gm
Soil/water distribution coef.	K_d	=	**4.00E-02**	cm3/gm
Calculated soil gas concentration	**C_{sg}(s)**	=	**0.00E+00**	**mg/m3**
D. SOURCE - Measured Soil Gas				
Measured soil gas concentration	**C_{sg}(m)**	=		**mg/m3 (ug/l)**

E. SOIL GAS CONCENTRATION USED IN RISK CALCULATIONS >>>> 3.60E-01 mg/m3

DIFFUSIVE TRANSPORT UPWARD IN UNSATURATED ZONE				
Total porosity	θ	=	4.34E-01	dimensionless
Air-filled porosity	θ_a	=	2.84E-01	dimensionless
Diffusion coefficient in air	D_a	=	1.00E-01	cm2/sec
Effective diffusion coefficient	**D_e**	=	**8.03E-03**	cm2/sec
Depth of contamination or Csg	X	=	1.98E+01	m
Calculated Flux	**F_x**	=	**5.25E-05**	**mg/m2-hour**

CALCULATING VAPOR CONCENTRATION IN BUILDING

A. INDOOR AIR COMPONENT

Floor area of building	A	=	9.68E+02	m2
% of floor area that flux occurs			1.00E+00	dimensionless
Attenuation factor(Crack factor)	S_b	=	1.00E-02	dimensionless
Flux area within building	Af	=	**9.68E+00**	m2
Interior Height of building	R_h	=	2.44E+00	m
Volume of building	V	=	**2.36E+03**	m3
Exchange rate of air	E	=	8.30E-01	exchanges/hr
Ventilation rate	Q	=	**1.96E+03**	m3/hr
Indoor air component	**C_i**	=	**2.59E-07**	**mg/m3**

B. OUTDOOR AIR COMPONENT

Downwind contamination length	L	=	0.00E+00	m
Wind speed	u	=	0.00E+00	m/hr
Height of building openings (or height of breathing zone)	h	=	0.00E+00	m
Outdoor air component	**C_o**	=	**0.00E+00**	**mg/m3**

C. TOTAL INDOOR AIR CONCENTRATION C_t = **2.59E-07** **mg/m3**

EXPOSURE SCENARIO

Body weight	BW	=	7.00E+01	kg
Inhalation rate	IR	=	2.00E+01	m3/day
Exposure duration	ED	=	2.50E+01	yrs
Hours per day	conversion		8.00E+00	hr/day
Exposure time	ET	=	**3.33E-01**	hr/24 hours
Days per week	conversion		2.50E+00	days/week
Weeks per year	conversion		5.00E+01	weeks/yr
Exposure frequency	EF	=	**1.25E+02**	days/yr
Averaging Time (carc. risk)	AT	=	2.56E+04	days
Averaging Time (non-carc. risk)	AT	=	**9.13E+03**	days
Chemical Intake (carc. risk)	**IT_c**	=	**3.01E-09**	**mg/kg-day**
Chemical Intake (non-carc. risk)	**IT_{nc}**	=	**8.46E-09**	**mg/kg-day**

NON-CARCINOGENIC RISK (Chronic Risk)

Chemical Intake (non-carc. risk)	IT_{nc}	=	8.46E-09	mg/kg-day
Reference dose	RfD	=	1.10E-01	mg/kg-day
Hazard Index	**HI**	=	**7.69E-08**	

CARCINOGENIC RISK

Chemical Intake (carc. risk)	IT_c	=	3.01E-09	mg/kg-day
Slope factor (potency)	SF	=	3.50E-03	1/(mg/kg-day)
Cancer Risk	**Risk**	=	**1.06E-11**	

Project Name: BRC Former Boeing C-6 Facility, Los Angeles, California

Chemical: Chloroform

Variable Descriptions				**Units**
CALCULATION OF SOIL GAS CONCENTRATION				
A. SOURCE - Free Product/Soil>100mg/kg.				
Mole fraction	MF	=	0.00E+00	dimensionless
Molecular weight	MW	=	1.20E+05	mg/mole
Vapor pressure	VP	=	2.59E-01	atm
Universal gas constant	R	=	8.20E-05	atm-m3/mole-K
Temperature	T	=	2.93E+02	K
Calculated soil gas concentration	**C_{sg}(fp)**	=	**0.00E+00**	**mg/m3**
B. SOURCE - Groundwater				
Water contamination level	C_w	=	1.50E+03	ug/l
Henry's Law Constant	H	=	1.50E-01	dimensionless
Calculated soil gas concentration	**C_{sg}(gw)**	=	**2.25E+02**	**mg/m3**
C. SOURCE - Soil < 100 mg/kg				
Soil contamination level	C_t	=		mg/kg
Henry's Law Constant	H	=	1.50E-01	dimensionless
Bulk density (dry)	ρ_b	=	1.50E+00	gm/cc
Air-filled porosity	θ_a	=	2.84E-01	dimensionless
Water-filled porosity	θ_w	=	1.50E-01	dimensionless
Weight fraction of organic carbon	f_{oc}	=	4.00E-03	dimensionless
Organic carbon partition coefficient	K_{oc}	=	5.30E+01	cm3/gm
Soil/water distribution coef.	K_d	=	**2.12E-01**	cm3/gm
Calculated soil gas concentration	**C_{sg}(s)**	=	**0.00E+00**	**mg/m3**
D. SOURCE - Measured Soil Gas				
Measured soil gas concentration	**C_{sg}(m)**	=		**mg/m3 (ug/l)**

E. SOIL GAS CONCENTRATION USED IN RISK CALCULATIONS >>>> 2.25E+02 mg/m3

DIFFUSIVE TRANSPORT UPWARD IN UNSATURATED ZONE				
Total porosity	θ	=	4.34E-01	dimensionless
Air-filled porosity	θ_a	=	2.84E-01	dimensionless
Diffusion coefficient in air	D_a	=	1.00E-01	cm2/sec
Effective diffusion coefficient	**D_e**	=	**8.03E-03**	cm2/sec
Depth of contamination or Csg	X	=	1.98E+01	m
Calculated Flux	**F_x**	=	**3.28E-02**	**mg/m2-hour**

CALCULATING VAPOR CONCENTRATION IN BUILDING

A. INDOOR AIR COMPONENT

Floor area of building	A	=	9.68E+02	m2
% of floor area that flux occurs			1.00E+00	dimensionless
Attenuation factor(Crack factor)	S_b	=	1.00E-02	dimensionless
Flux area within building	Af	=	**9.68E+00**	m2
Interior Height of building	R_h	=	2.44E+00	m
Volume of building	V	=	**2.36E+03**	m3
Exchange rate of air	E	=	8.30E-01	exchanges/hr
Ventilation rate	Q	=	**1.96E+03**	m3/hr
Indoor air component	**C_i**	=	**1.62E-04**	**mg/m3**

B. OUTDOOR AIR COMPONENT

Downwind contamination length	L	=	0.00E+00	m
Wind speed	u	=	0.00E+00	m/hr
Height of building openings (or height of breathing zone)	h	=	0.00E+00	m
Outdoor air component	**C_o**	=	**0.00E+00**	**mg/m3**

C. TOTAL INDOOR AIR CONCENTRATION C_t = **1.62E-04 mg/m3**

EXPOSURE SCENARIO

Body weight	BW	=	7.00E+01	kg
Inhalation rate	IR	=	2.00E+01	m3/day
Exposure duration	ED	=	2.50E+01	yrs
Hours per day	conversion		8.00E+00	hr/day
Exposure time	ET	=	**3.33E-01**	hr/24 hours
Days per week	conversion		2.50E+00	days/week
Weeks per year	conversion		5.00E+01	weeks/yr
Exposure frequency	EF	=	**1.25E+02**	days/yr
Averaging Time (carc. risk)	AT	=	2.56E+04	days
Averaging Time (non-carc. risk)	AT	=	**9.13E+03**	days
Chemical Intake (carc. risk)	**IT_c**	=	**1.88E-06**	**mg/kg-day**
Chemical Intake (non-carc. risk)	**IT_{nc}**	=	**5.29E-06**	**mg/kg-day**

NON-CARCINOGENIC RISK (Chronic Risk)

Chemical Intake (non-carc. risk)	IT_{nc}	=	5.29E-06	mg/kg-day
Reference dose	RfD	=	8.60E-02	mg/kg-day
Hazard Index	**HI**	=	**6.15E-05**	

CARCINOGENIC RISK

Chemical Intake (carc. risk)	IT_c	=	1.88E-06	mg/kg-day
Slope factor (potency)	SF	=	1.90E-02	1/(mg/kg-day)
Cancer Risk	**Risk**	=	**3.58E-08**	

CHEMICAL PARAMETERS

CAS No.		MW (mg/mole)		H' (dimension-less)		Da (cm^2/sec)		VP (atm)	Temp. (°C)		K_{oc} (cm^3/g)		Water Solubility (mg/L-water)		CSF (inh) $(mg/kg-day)^{-1}$		Chronic RfD (inh) (mg/kg-day)	
127-18-4	Tetrachloroethylene (PCE)	1.7E+05	a	7.5E-01	a	7.2E-02	a	2.4E-02	25	b	2.7E+02	a	2.0E+02	a	2.1E-02	c	1.0E-02	e
75-09-2	Methylene Chloride	8.5E+04	a	9.0E-02	a	1.0E-01	a	5.7E-01	25	b	1.0E+01	a	1.3E+04	a	3.5E-03	c	1.1E-01	e
67-66-3	Chloroform	1.2E+05	a	1.5E-01	a	1.0E-01	a	2.6E-01	25	b	5.3E+01	a	7.9E+03	a	1.9E-02	c	8.6E-02	e

References:

a EPA Region 9, Preliminary Remediation Goals (PRGs), 2000.
b U.S. National Library of Medicine Hazardous Substance Data Bank (HSDB), http://www.nlm.nih.gov/pubs/factsheets/hsdbfs.html
c Cal-EPA Office of Environmental Health Hazard Assessment (OEHHA), Toxicity Criteria Database and December 2000 California Cancer Potency Values, http://www.oehha.ca.gov/risk/chemicalDB/index.asp
d Risk Assessment Information System (RAIS) Toxicity & Chemical-Specific Factors Data Base, January 2001, http://risk.lsd.ornl.gov/cgi-bin/tox/TOX_select?select=csf
e Cal-EPA, Air Resources Board (ARB), Consolidated Table of OEHHA/ARB Approved Risk Assessment Health Values, October 10, 2000, http://www.arb.ca.gov/ab2588/riskassess.htm

Toxicity Value reference priority:

1. Cal-EPA Office of Environmental Health Hazard Assessment (OEHHA), Toxicity Criteria Database and December 2000 California Cancer Potency Values, http://www.oehha.ca.gov/risk/chemicalDB/index.asp
2. Cal-EPA, Air Resources Board (ARB), Consolidated Table of OEHHA/ARB Approved Risk Assessment Health Values, October 10, 2000, http://www.arb.ca.gov/ab2588/riskassess.htm
3. EPA Region 9, Preliminary Remediation Goals (PRGs), 2000.